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THE

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THE

OPHTHALMIC RECORD.

VOL. III. AUGUST, 1893. No. 2.

# SHOULD A MYDRIATIC BE USED AS A RULE IN REFRACTION CASES? WHAT ONE?*

BY J. E. MINNEY, A.M., M.D.,
Professor of Ophthalmology and Otology in the Kansas Medical College,
TOPEKA, KAN.

The object of this inquiry is to learn the practice of oculists respecting the frequency with which they use a mydriatic and the kind employed, together with the reasons for their practice and remarks on the subject. With this in view, the following is a copy of a letter sent to twenty-two oculists of the United States:

TOPEKA, KAN, MAY 26, 1891.

DEAR SIR:—In what per cent. of your cases of refraction do you use a mydriatic? (A) The mydriatic approximately.

1. Atropine, —— per cent. of cases?
2. Homatropine, —— per cent. of cases?
3. Cocaine, —— per cent. of cases?
4. If other mydriatic, name it; —— per cent. of cases?

(B) Refraction approximately in which you use it.

---

* Read before the Section of Ophthalmology and Otology of the Kansas Medical Society, at Topeka, May 12, 1893.

1. Presbyopia, ——.
2. Hypermetropia, ——.
3. Myopia, ——.
4. Astigmatism, ——.

An early reply will greatly oblige.

Yours very truly,

J. E. Minney.

Answers were received from each one as follows:

Dr. E. L. Holmes, Chicago, Ill.:

I seldom use a mydriatic except in cases of young persons with astigmatism or hypermetropia.

Dr. H. Knapp, New York:

I use a mydriatic in about twenty-five per cent. of my refraction cases; in convergent strabismus and esophoria I use it in all cases.

Dr. Julian J. Chisholm, Baltimore, Md.:

I use a mydriatic in about thirty-three per cent. of my refraction cases.

Dr. G. Strawbridge, Philadelphia, Pa.:

I have practically given up the use of a mydriatic in refraction cases for the past fifteen years. The only very rare exception being cases of high grades of hypermetropia in children.

Dr. Edward Jackson, Philadelphia, Pa.:

I use a mydriatic in all cases under forty-five, and some to fifty or over.

Dr. A. E. Prince, Springfield, Ill.:

Regarding a mydriatic, I use invariably homatropine six per cent., dropping in one drop, following it up from thee to five minutes; following this up a third time after a similar interval, and then waiting about an hour before making the examination.

In almost all the cases complete paralysis is effected, and the entire examination completed in about an hour and a half. I formerly used atropine, but found it so very inconvenient to the patient that I abandoned it entirely upon ascertaining the results of the work accomplished by homatropine in this strength. When weaker solutions are used, it is entirely unreliable.

Dr. Swan M. Burnett, Washington, D. C.:

I do not use a mydriatic as a routine practice. The one I now employ most extensively is the hydrobromate of homatropine. The indication for the use of a mydriatic in my practice is the age of the patients and the non-harmony of the findings by the test letters, the ophthalmoscope and the skiascope, and, in cases of astigmatism, by the ophthalmometer.

Dr. Wm. Cheatham, Louisville, Ky.:

I find atropia sulph. gives me better satisfaction than any other mydriatic. I have at times given it up for others, but return to it with more confidence than ever. I occasionally find a ciliary muscle it will not paralyze, but have found nothing else when it fails. Homatropine, in my estimation, is very unsatisfactory. The ophthalmoscope is of great service to me in determining when the accommodation is paralyzed.

Dr. Wm. F. Mittendorf, New York City:

In presbyopia there is danger of bringing on glaucoma by the use of atropine, and as nearly all hypermetropia has become manifest there is no reason for using atropine. Myopia only in cases where it is progressive. Hypermetropia and astigmatism, if glasses fail to give satisfactory vision or the ophthalmoscope indicates very much higher degree than the patient will accept.

Dr. S. C. Ayers, Cincinnati, O.:

I use only homatropine in refraction tests. It is satisfactory to me. Occasionally a case requires atropine.

Dr. John F. Fulton, St. Paul, Minn.:

I use a mydriatic in the correction of all errors of refraction if the patient has the time to submit to it, as I find it very rare indeed to meet with an individual who has been driven to consult an oculist, in consequence of a refractive trouble, who has not a pathological condition of the back-ground, varying from a slight hyperæmia to severe inflammation, resulting in structural changes and loss of function. The mydriatic is used for the double purpose of revealing this trouble of the back-ground, at the same time putting the eye in a condition in which we are able to make a perfect examination and correction.

I have no confidence in any mydriatic, for correcting refractive trouble, excepting atropine, having tried them all from time to time, and have found that they cannot be relied upon.

Homatropine and cocaine are used in refractive cases only for the purpose of making a thorough examination. For simple presbyopia, not associated with hypermetropia, myopia or astigmatism, I do not use a mydriatic. I might say that I correct astigmatism altogether now by means of Javal's and Schiotz ophthalmometer, and find it absolutely reliable. I look upon it as the most correct instrument yet invented for the correction of astigmatism.

Dr. Jas. P. Parker, Kansas City, Mo.:

I use a mydriatic in all cases except presbyopia. I have had cause to regret writing a paper on homatropine while assistant in the eye department of the Jefferson Medical College Hospital, of Philadelphia. I then had great confidence in homatropine, but my successors have had to prescribe atropine and do my work over in cases of a low degree of astigmatism. Homatropine will not unmask low degrees of astigmatism. Hyoscyamine (sulph.) is better than homatropine. I am afraid of it since I had a patient experience the systemic effects of the drug to such an exaggerated degree. I now prescribe sulph. of atropia in all cases when the patient can afford to take the necessary time for its effects to wear off. I prescribe homatropine only when the patient is in a great hurry to return to work. I often fail to correct low degrees of astigmatism on account of the patients deceiving themselves, but I am sure that I get better results with atropine than any other mydriatic. Its effects last long enough for you to study the patient and learn if he is deceiving himself, which is very hard to overcome in some patients.

Dr. Eugene Smith, Detroit, Mich.:

I do not use homatropine or cocaine as a mydriatic, and do not use atropine in myopia except in the progressive form. I prefer the ophthalmoscope, retinoscopy and Javal-Schiotz ophthalmometer in refraction cases.

Dr. E. J. Gardiner, Chicago, Ill.:

I use atropine in nearly all cases of hypermetropia when the patient is under thirty years of age; also if the objective test does not correspond with the estimate of hypermetropia with the ophthalmoscope, or if the symptoms point to an error of refraction which is not manifest. If the patient is over twenty-five, I try homatropine.

Myopia in young patients, when the degree of myopia is slight, I use homatropine. If a higher degree is discovered, and I suspect slight spasm of accommodation, atropine is used. In patients over twenty I dispense with the mydriatic. In all cases of astigmatism, when the patient is under twenty, I use atropine; if over twenty, I try homatropine. Over thirty I dispense with the mydriatic. Of course you can readily understand that these are not iron-clad rules, and that the exceptions are numerous. I believe that there is no department of our work in which there is more room for judgment than in refraction work.

Dr. W. T. Montgomery, Chicago, Ill.:

It is my practice to use a mydriatic in all cases under thirty years of age requiring compound lenses. Atropine one per cent. solution is the form of mydriatic I prefer. I have used homatropine, two per cent. solution, duboisine, one per cent. solution, but do not consider them reliable, and only these when atropine is for some reason contraindicated. I have never used cocaine in refraction cases, and never used a mydriatic in presbyopic patients, and only a small per cent. of cases in simple hypermetropia. I prefer to correct the manifest defect and increase the strength of the lens as the defect comes out. It occasionally happens that I am obliged to adjust cylinders and even compound lenses without the use of a mydriatic, but I tell the patient that I am not sure that I have fitted them correctly, and that their glasses may have to be changed.

Dr. G. C. Savage, Nashville, Tenn.:

I have to-day run over my last 250 cases or, more properly speaking, 500 eyes with the following results: Of the 84 4-5 per cent. of astigmatism, there were of hypermetropic astigmatism 67 4-5 per cent.; myopic astigmatism, 13 1-5 per cent.; mixed astigmatism, 3 4-5 per cent. In a considerable number of the cases the hypermetropic and myopic astigmatism was simple. I have left out presbyopia because it does not cut much of a figure in my records. My homatropine mixture is of the strength of eight grains to the ounce. In persons under forty-five years I put one drop in each eye every five minutes until ten drops have been put in each; then I consider the accommodation fully suspended and the patient ready for the work of refraction. If age has partly suspended accommodation, I use fewer drops of the homatropine solution. If the patient be fifty-five to sixty or older, I usually instill only one drop. In all patients over forty-five, after the refraction has been accomplished, I use from one to five drops of a solution of eserine in each eye. In persons under forty-five, who must resume near work inside of thirty-six to forty-eight hours, I use eserine as above. I suppose that eighty-five per cent. of my cases are under forty-five years, hence have no presbyopia.

Dr. C. M. Hobby, Iowa City, Iowa:

1. Atropine is used whenever I suspect spasm. Hyperopia with limited accommodation. Myopia of the young—estimate, five per cent.

2. Homatropine generally. Exceptions: Myopia of the aged alone after forty-five years. Mydriatics are used with extreme caution, say ten per cent.

3. Cocaine only as a preliminary to ophthalmoscope or ophtalmometry—No estimate.

4. Many years ago I used duboisine in perhaps fifty cases. I do not use any other mydriatic than atropine and homatropine. I do not use a mydriatic in simple presbyopia. I invariably use a mydriatic in hyperopia under forty years of age; also in myopia under forty years of age. I use a mydriatic with the addition of atropine to test in the young. In astigmatism, under forty years of age, I make a double determination: First, without a mydriatic: second, with, and am guided in the compromise by the measurement by Javal's ophthalmometer. I believe that the 'half has not been told' concerning the influence of the ciliary muscle upon refraction.

Dr. Dudley S. Reynolds, Louisville, Ky.:

I use a mydriatic in all cases of refraction excepting in uncomplicated cases of presbyopia. I use hydrobromate of homatropine, one grain dissolved in one drachm of distilled water; of this I instill a single drop every minute or two until ten or twelve applications have been made. After fifty or sixty minutes after the last application the accommodation is usually found suspended. In three out of 572 cases homatropine failed and the sulphate of atropine was employed. Cocaine does not suspend the accommodation, and is therefore totally unfit for use in testing refraction. It is a patent fact that a person in good health, requiring above one-sixtieth for comfortable reading, has hypermetropia, and to determine the refraction a mydriatic is necessary.

I have often seen persons wearing negative lenses who, upon suspending the accommodation, turned out to be hypermetropes. It is very common to find persons with hypermetropic astigmatism wearing negative lenses prescribed by some person who thinks himself able to determine the refraction by ophthalmoscopic examination.

In my opinion no error of refraction in any person under forty years of age can possibly be corrected without first suspending the accommodation.

Dr. Geo. M. Gould, Philadelphia, Pa.:

I use a mydriatic in perhaps ten to twenty per cent. of my presbyopes, and always use it in cases other than presbyopes. I use instillations of homatropine every five minutes for about three-fourths of an hour; then one or two of cocaine. Have every proof that this plan gives paralysis of the ciliary muscle.

Dr. F. C. Hotz, Chicago, Ill.:

I use homatropine, four per cent. solution, and only when the tests do not satisfactorily egree so that there may be a possibility of incomplete relaxation of the ciliary muscle. I use atropine for several days, but I find this necessary in very few cases: I am sure not one in one hundred. I never use a mydriatic for presbyopia, and I think nobody does; but I use it in every case of refraction whenever the various tests (test type, accommodation, reading, ophthalmoscope or shadow) do not fully agree; and in young persons always when astigmatism is shown or suspected, as for instrance in cases like this, which are not uncommon: Young man, aged twenty; healthy; complains of eye pain and blurred vision when working over books All you can find is hypermetropia 50 D., with vision $\frac{20}{20}$, good accommodation and normal muscular action. Here I always suspect hypermetropic astigmatism .50 D., instead of hypermetropia I usually find it under homatropine, for a .50 D. plain hypermetropia does not give any trouble to the eye unless its possessor is in poor health or of a neurotic stock. On the other hand, when the ophthalmoscope shows, for instance, M. 3 D., when neither the shadow or astigmometer shows any astigmatism, when the trial lenses give $V = \frac{20}{20}$ with — 3 D. and accommodation power is satisfactory, why should I then use a mydriatic? and I do not.

So you see, my dear doctor, that I do not practice in groves cut by theoretical rules and views, but allow common sense a wide, free scope in any refractive work.

Dr. Richard H. Derby, New York City:

I rarely use a mydriatic in these cases. The ophthalmoscope and the Javal-Schiotz ophthalmometer and the ordinary examination with glasses enables me to reach safely a diagnosis.

Dr. H. Derby, Boston, Mass.:

Astigmatism is the affection in which a mydriatic is most generally employed, and my preference in these cases is, on the whole, for homatropine; but since using the Javal-Schiotz ophthalmometer I regard the paralysis of the accommodation as less generally necessary.

Dr. Noyes, New York:

In myopic astigmatism, both simple and compound, atropine is rarely necessary. In marked compound hyperopic astigmatism it may often be dispensed with. In simple hyperopic astigmatism it will often be necessary, and the same remarks apply to mixed astigmatism. In my own practice a mydriatic is used in from thirty to forty per cent. of the cases excepting presbyopia, and atropine is the mydriatic relied upon.

To obtain the best results with safety, in the shortest time and with the least inconvenience to the patient, is the object of the physician.

### SYNOPSIS.

1. Five of the twenty-two oculists use a mydriatic in all cases of refraction Two, in ninety per cent. or over of the cases; three, in twenty-five per cent.: six seldom use it; six do not use it as a routine practice.

2. The kind of midriatic used: Five in seventy-five to one hundred per cent. of their cases use atropine; seven in sixty-five to one hundred per cent. use homatropine; three do not use homatropine; one uses homatropine and cocaine in seventy-five per cent.; two use cocaine in twenty to fifty % of their cases; one uses duboisia, four per cent. solution, in some cases.

3. The kind of refraction cases: One uses cocaine in ninety per cent. of presbyopia. One uses homatropine and cocaine in ten to twenty per cent. of cases of hypermetropia. The others do not use a mydriatic at all in such cases.

A mydriatic is used more in hypermetropia and astigmatism than in myopia.

In my own practice atropine is the mydriatic used, but not as a routine practice.

The foregoing shows a marked difference in the practice of ophthalmologists in the frequency with which a mydriatic is used and the kind used.

All of these oculists are among the best, or are the leading ones in the profession.

They are successful, hence get good results, and their opinions have weight.

They all have the same object in view, but, like our religious denominations, go on different roads and get there.

This subject cannot be discussed at this time in its entirety, but the following considerations may enable us to see, in a measure, the cause for the difference in practice and results, and some of the difficulties with which the oculist has to contend.

There is a tonic contraction of the muscular system in its normal condition The ciliary muscle is no exception to the rule. When the muscle of accommodation (ciliary) is paralyzed by a mydriatic, there is often a slight change of the refraction.

For example, if an eye is .50 D. hypermetropic, the paralysis may increase the hypermetropia .50 D. to 1 D.

The maximum dilatation is obtained. This is shown in case af paralysis of the third nerve — motor oculi — by disease. If atropine is used in such a case, the pupil becomes more dilated.

Atropine not only paralyzes the motor or contracting fibers of the ciliary muscle and iris, but stimulates the dilating fibers or those controlled by the sympathetic.

In a very myopic eye the transverse diameter of the ciliary muscle is much smaller than in the emmetropic eye. This is due to a lack of development of the circular fibers, and in some cases they are almost entirely lacking.

The circular fibers of the ciliary muscle have to do mainly with accommodation, and in myopic eyes are but little used, hence the lack of development from non-use.

In hypermetropic eyes the opposite condition obtains The constant accommodative effort causes a true hypertrophy of the ciliary processes. The ciliary body is much larger than in the myopic eye. "This is probably a factor in the genesis of glaucoma. Owing to this enlargement of the ciliary muscle, it pushes forward against the iris and narrows the sinus of the anterior chamber."

In astigmatic eyes there is an irregular or unsymmetrical development of the muscle of accommodation.

Rays of light, coming from a distance of six meters or twenty feet are not parallel by from 1-6 to 1-4 D.; and if this is not taken into account, an over correction will be made and a failure to give relief.

Again: The refraction of the pupil when dilated is not always the same as that portion remaining in use after contraction of the pupil.

Again: Changes in the axis of astigmatism sometimes occur with the use of a mydriatic. All mydriatics do not paralyze the accommodation. Atropine locally applied stimulates the terminal filaments of the sympathetic and paralyzes the nerve endings of the motor oculi supplying the iris and ciliary muscle; hence completely dilates the pupil and paralyzes the accommodation. Cocaine does not paralyze the motor oculi, but dilates the pupil by stimulating the sympathetic.

The object of using a mydriatic in refraction cases is to paralyze the ciliary muscle and thus overcome spasm of accommodation and to reveal the latent error of refraction.

Durr found spasm of accommodation in from seven to eleven per cent. of 133 myopes.

Dr. Jackson found in 214 eyes latent hyperopia in thirty-two per cent., and sixty-eight per cent. having no latent hyperopia. These eyes ranged in age from fifteen to fifty years, and the highest degree of Hl. was .70 D. Latent hyperopia was least frequent under twenty years of age, being twenty-one per cent. and most frequent between forty-five and fifty, being forty-seven per cent.

This shows that latent hyperopia is the exception and not the rule, as was formerly taught, and is believed by many physicians to-day.

The following is Dr. Jackson's table — thirty :

| AGE. | HAVING NO LATENT H. | HAVING LATENT H. | PER CENT. LATENT H. | AMOUNT OF H. LATENT. |
|---|---|---|---|---|
| 15 | 79 | 21 | 30 | 0.70 |
| 25 | 79 | 21 | 26 | 0.45 |
| 25 | 77 | 23 | 24 | 0.57 |
| 30 | 64 | 36 | 33 | 0.62 |
| 35 | 62½ | 37½ | 26 | 0.41 |
| 40 | 68 | 32 | 20 | 0.31 |
| 45 | 62½ | 37½ | 15 | 0.39 |
| 50 | 53 | 47 | 35 | 0.33 |

Briefly, to summarize, the facts to which this paper is designed to direct attention are these :

That the latency of hyperopia is essentially exceptional, inconstant and abnormal ; that it is not more frequent or proportionately greater in childhood or in early adult than in middle life ; that the amount of manifest hyperopia discovered depends largely upon the method of testing for it, and from these follow certain practical deductions, viz. : A mydriatic is as frequently needed and as strong a mydriatic is needed to render manifest the total hyperopia at forty-five as at fifteen.

In correcting hyperopia without the use of a mydriatic, the assumption would be that the total hyperopia is manifest, to add something for assumed latent hyperopia will, in the majority of cases, entail imperfect distant vision which will continue as long as the lens thus ordered is worn.

In prescribing a lens, correcting less than the total hyperopia, we are allowing for an inconstant, temporary, mainly abnormal condition, and should warn the patient of the probable early need for a change of lenses, and that the best and most permanent relief is not to be expected until such change is made.

It would usually be unnecessary to employ a mydriatic to render manifest the total hyperopia if we only had some certain means of detecting the exceptional cases in which it is necessary.

We have quoted largely from Dr. Jackson, first, because we agree with him, and second, because we disagree with him.

Our findings practically agree with the report as given in the foregoing table, and was determined in the following way:

1. The error was found without the atropine, and a record made of the case, and then the error was found while fully under the effect of the mydriatic, and the result recorded and the findings compared.

In order to maintain the ciliary muscle in its normal condition, it is necessary to exercise it: and in prescribing artificial help for the eyes, the weakest glass should be selected, which will enable the muscle to do its work with comfort and at the same time give normal vision. In allowing for this accommodative effort, the judgment of the oculist is taxed.

My practice is, first, to make the test without atropine; second, to get the clearest vision—comfortable—for the work and distance required: third, then have the patient read fine print with the trial glasses one or two hours in the office twice a day, and for the same length of time at home in the evening; fourth, if these trial lenses prove to be comfortable to the eyes, and cooling as they sometimes express it, I prescribe them, and the patient is directed to report within the next month if the glasses are not satisfactory; fifth, if the patient is in doubt or the findings do not agree, or there is an unpleasant sensation in the eyes on the use of the glasses, or the patient's answers are contradictory, atropine is used as a rule.

The patients are always asked to report within a month if the glasses are not satisfactory, for in every case allowance must be made for that unknown quantity, life force, and scientific hedging must be done.

We are under obligations to the oculists who have furnished this paper for us.

Authorities consulted: Noyes, Fuchs and Transactions of the Section of Ophthalmology and Otology of the American Medical Association.

# SECTION OF OPHTHALMOLOGY, PAN-AMERICAN MEDICAL CONGRESS.

Meeting: Washington, September 5th., 6th., 7th., and 8th., 1893.

DR. J. J. CHISOLM, President;
DRS. G. M. GOULD and J. HARRIS PIERPONT, Secretaries.

[ Below we publish a list of the papers that have been promised for the Washington Meeting. We have separated from the general list sent us those papers that are to be read on the second and third days of the meeting. We do not know just the order in which even these papers will be read, nor do we know in what order the miscellaneous papers will be taken up. The second day, viz., Sept. 6, as before published in this Journal, will be devoted to the study of *Refractive Errors.* The third day. Sept 7th., will be devoted to the study of *Muscle Errors.* It may be predicted before-hand that the several papers promised on these subjects will be fully and freely discussed. We further predict that the attendance on the Section through-out the entire meeting will be large. As will be seen, many papers have been promised on other subjects pertaining to ophthalmology.—Editor.]

## REFRACTIVE ERRORS.

1. Further studies of the cycloplegic value of Homatropin and Cocaine disk as a substitute for Atropin and Hyosciamin, by Dr. Casey A. Wood, of Chicago.

2. The relation of Skiascopy to other tests for the determination of the ocular refractions, by Dr. H. V. Würdemann, of Milwaukee.

3. The necessity for complete suspension of accommodation by mydriatics in the adjustment of glasses, by Dr. G. C. Savage, of Nashville.

4. A contribution to Refractive Errors, by Dr. J. C. Morgan, of Philadelphia.

5. Refraction Anomalies of Artists, by Dr. J. C. Morgan, of Philadelphia.

6. Astigmatism following Cataract extractions and other sections of the cornea, by Dr. Edward Jackson, of Philadelphia.

7. A few thoughts about Ophthalmometry, as to what the Javal Instrument will do, and what it will not, by Louis J. Lautenbach, of Philadelphia.

### HETEROPHORIA

8. A clinical study of Heterophoria, by Dr. Hiram Woods, of Baltimore.

9. An analysis of fifty cases of Internal Squint, by H. F. Hansell, of Philadelphia.

10. Some forms of Anomalies in Eye Muscles, by Dr. E. J. Gardner, of Chicago

11. Affections of the Nose, as a cause of the want of concordance of the action of the Eye Muscles, by Dr. W. Cheatham, of Louisville.

12. Further experiences in graduated Tenotomy, by Dr. Chas. H. Thomas, of Philadelphia.

### MISCELLANEOUS.

13. Treatment in Six cases of "Irido-Cyclitis" complicated with cataract, by Dr. Robt. L. Randolph, of Baltimore.

14. Homeochronus hereditary optic atrophy, by Dr. Geo. M. Gould, of Philadelphia.

15. Electric Therapeutics in Ophthalmic Practice, by Dr. L. A. W. Alleman, of Brooklyn.

16. Gouty and Rheumatic Affections of the Eye, by Dr. W. Oliver Moore, of New York.

17. Some experiences in Hemorrhagic Glaucoma, its progress and treatment, by Dr. S. D. Risley, of Philadelphia.

18. Suppurative processes of the Vitreous, by Dr. J. F. Fulton, of St. Paul.

19. The local application of Bichlor. of Mercury in the deep inflammations of the Eye, by Dr. W. F. Mittendorf, of New York.

20. A clinical study of the visual field in Hemianopia, by Dr. Chas. A. Oliver, of Philadelphia.

21. Glaucoma from traumatic causes, by Dr. E. Lopez, of Havana, Cuba.

22. Skin grafting for Malignancy of the Eye Lids, by Dr. F. B. Tiffany, of Kansas City.

23. Spontaneous replacement of a case of detached Retina by Dr. J. Wallace, of Philadelphia.

24. The Nomenclature of Blepharitis, by Dr. Dudley S. Reynolds, of Louisville.

25 Etiology and early management of Glaucoma, by Dr. G. E. Dean, of Scranton.

26. Acute Monocular Neuro-retinitis with cases, by Dr. B. L. Millikin, of Cleveland.

27. Orbital Tumors, by Dr. W. B. Johnson, of Patterson, N. J.

28. Exophthalmus Traumaticus, by Dr. L. F. Love, of Philadelphia.

29. Further observations on the Eye of the Negro, by Dr. C. W. Kellock, of Charleston.

30. Hemorrhagic or crupous Iritis, by Dr. A. Alt, St. Louis.

31. The hygienic and scientific value of Examinations of the Eyes in the schools, by Dr. B. A. Randall, of Philadelphia.

## The Scientific Proceedings of the Section of Ophthalmology of the American Medical Association, at the Milwaukee Meeting, June, 1893.

*Continued from page 33, current volume.*

ABSTRACT OF A PAPER ON

# PHLYCTENULAR OPHTHALMIA,

By DUDLEY S. REYNOLDS, A.M., M.D.,
Professor of Ophthalmology, Otology and Medical Jurisprudence,
in the Hospital College of Medicine, Medical Department of
the Central University of Kentucky.

[This abstract should have been printed on page 29, current volume, but was not in hand. For most of the discussion brought out by Dr. Reynolds' paper see pages 29, 30, 31, 32 and 33.—Editor.]

Phlyctenular Ophthalmia has been so variously described by writers and teachers, it would seem but fair to assume that each may have been faithful in describing that form most frequently observed in his practice.

Believing no form of Phlyctenular Ophthalmia should be regarded as a merely local form of disease, calling for local treatment alone, I am led to introduce the subject in its clinical aspects.

It is certain the herpetic disease described by Stellwag is just as much a local manifestation of constitutional dyscrasia as are the serpiginous ulcers, or the more common conoidal masses of lymphoid cells described by the old writers as scrofulous, and syphilitic ophthalmia.

It is very important to distinguish between the phlyctenular diseases of miasmatic and malarious localities, and those observed in strumous rachitic and syphilitic subjects. According to some writers it would be difficult to determine the syphilitic from the non-syphilitic cases; but syphilitic keratitis rarely ulcerates yet it is nearly always attended by photophobia, by anæmia, and other manifestations of disturbed nutrition.

In all forms of circumscribed inflammations it may be fairly assumed the processes of zymosis are going on, fermentation being, in fact, an essential feature of all localized inflammations. Change of residence, change of diet, in fact any change in the modes of living result sometimes beneficially.

Phlyctenular disease of the cornea, like that of the limbus conjunctivalis, fluctuates according to the state of the patient's general health and nutrition; consequently a great deal has been claimed for local treatment in such cases.

In some circumscribed abrasions of the corneal epithelium a small grey speck is seen called phlyctenular keratitis, often cured by a single drop of Atropine solution, just as it would have been by a drop of Boric Acid solution, or anything which would tend to diminish the morbid sensibility in the abraded spot.

The more common types of this disease are observed in the early stages as conoidal elevations, surrounded by dilated blood vessels. The oldest cells in the cone break down first, leaving a vesicular appearance at the apex of the cone; presently the walls of the vesicle rupture, and the ulcerated stage is present; meantime the eye is morbidly sensitive to light, and the patient, if the disease be in the cornea, is harassed with pain and disturbances of the digestive organs, with more or less loss of appetite.

An aperient containing calomel, followed by quinine, often cures the patient in three or four days' time. I have frequently observed this course in cases which hed been subjected for weeks to local treatment of calomel, mydriatics, myotics, and ointment of Yellow Oxide of Mercury, so much in vogue with some of our brother specialists.

Foreign bodies in the cornea often drop out and are washed away with the tears, leaving an epithelial abrasion, which in persons of previous good health, will disappear without treatment; if infection of this wound should occur, the indications of this state are so marked as to mislead no ordinarily careful clinical observer. The treatment in such cases should, of course, be local and at the same time vigorous; if however, this is observed in children with fever, or even in an adult, constitutional disturbances call for constitutional treatment, independently of the disease in the eye.

It is not always easy to discover the cause of phlyctenular ophthalmia, just as it is often difficult to determine the syphilitic from the non-syphilitic subjects amongst the poorly nourished children which are observed at the public clinics everywhere.

It is never safe to rely upon what is known as the history of the case as related by the family, and if I were not addressing myself to a body of gentlemen, many of whom have at times engaged in the general practice of medicine, I should say the statements of the family physician are just as misleading and unreliable.

If your patient is the subject of inherited syphilis, and has phlyctenular ophthalmia you should not be able to discover the fact by the condition of the eye alone. I have often observed phlyctenular keratitis as a complication of pre-existing interstitial keratitis. Thus the conditions stated in the discription of inherited syphilis in Mr. Hutchinson's famous prize essay, cannot apply to a very large number of cases, and especially in children whose permanent incisor teeth have not yet appeared.

That state of overloaded lymph channels, with enlarged lymphatic glands, at one time supposed to be indicative of tuberculosis or inherited syphilis, and for a long time denominated scrofulosis, is now known to be brought on by excessive indulgence in the glucose types of food; even starvation itself is attended by an abnormal increase in the lymph stream, with enlarged lymphatic glands.

The late Dr. Henry F. Formad, of the University of Pennsylvania, demonstrated certain structural peculiarities in the lymphatic system of subjects of inherited syphilis, the children of tuberculous parents, and in those with acquired struma. His researches show conclusively that some of the forms of malnutrition in infants result from faulty development in fetal life.

Inherited syphilis, localized zymosis, mechanical obstructions in the capillary lymph tubes of the conjunctiva, may each set up local changes which may pass through all the varying stages of cell proliferation, disintegration, ulceration, and partake of those characters called phlyctenular disease because of their circumscribed nature.

## DISCUSSION.

Dr. Ziegler:

My experience coincides with that of Dr. deSchweinitz. The *immediate* origin of phlyctenular attacks is almost always *nasal*, and not constitutional as stated by most authors. Examination usually reveals associated lesions of the nostril and eye of the same side. If you treat the nose the eye will frequently recover without treatment. A simple treatment is by the nasal spray, and intra-nasal applications of Tr. Benzoin. Comp., two or three times a week (applied with cotton on a wire applicator). You may use a simple wash for the eye. An ointment of hydrag. ox. flav. may prove useful.

Gastro-intestinal disturbances may originate or exaggerate the attack, by causing reflex irritation of the nose. I agree with Dr. Thompson when he recommends *regularity of diet*, and especially in children who are constantly eating cakes and candies, which perhaps do more harm than any other variety of food. But a worse error in diet is the coffee and tea furnished by parents to their children, which soon saps their vitality. The worst examples of this unhygienic regimen are seen in hospital practice, and my formula has invariably been "*no tea, no coffee, no cakes and no candy.*" This alone may bring recovery. Of course the bowels should be kept regular. Salt-water baths are excellent for toning up the relaxed surface of the body.

Dr. Dudley S. Reynolds closing:

Mr. President, I am quite surprised that Dr. de Schweinitz should have misunderstood my remarks in reference to syphilis. I am sure no one would make a diagnosis of syphilis from any peculiar appearance presented in any form of phlyctenular ophthalmia by reference to the eye alone.

I have seen cases I felt sure were due to syphilis, but other manifestations of syphilis, so distinctly characteristic as to leave no room for doubt, were present, without reference to the disease of the eye.

I quite agree with Dr. Gradle that nasal diseases are frequent complications, upon the relief of which, the successful treatment of the eye depends.

My neighbor, Dr. Thompson, points out the value of climatic changes. He frequently observes a large number of these cases in the early summer, and if he is able to induce the parents to take the child away from the city, and remain until fall, he frequently finds no other treatment necessary. I feel impressed that these cases fall into the hands of general practitioners, and get quinine, iron, the iodides, bathes, outdoor exercise, and mineral waters, which, with change of diet, bring on such improved states of nutrition as to completely remove the constitutional dyscrasia, upon which the local disease in the eye depends.

Dr. Conner, of Detroit, expresses an important truth in his statement that Hospital cases frequently relapse on returning home, and speedily recover when subjected to the hygiene and improved diet of the Hospital.

Eczematous eruptions of the face, and especially about the eye-lids, should be treated as complications merely, and not as causes of phlyctenular disease; the Yellow Oxide of Mercury ointment is no doubt valuable, in fact I am sure it is in eczematous complications, and in some of the chronic ulcerated forms of keratitis, but those are not to be counted as ordinary types of phlyctenular disease.

The point I tried to make plain in my paper is, that all local diseases known as Phlyctenular Ophthalmia, not clearly due to traumatic causes, should be regarded as local manifestations of a constitutional dyscrasia; that constitutional treatment is always demanded, and local treatment if applied at all, should be mild and soothing, and never stimulating or irritating in character.

Syphilitic cases are to be known by other manifestations independently of the disease in the eye, and call for certain modifications in the constitutional treatment only.

ABSTRACT OF A PAPER ON

# PURULENT OPHTHALMIA FROM THE STANDPOINT OF ITS SPECIFIC MICROBIC CAUSE, WITH A PLEA FOR A MORE ENERGETIC, RATIONAL, ABORTIVE TREATMENT, WHERE POSSIBLE.

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## CONCLUSIONS.

1. That all cases of purulent conjunctivitis are of microbic origin and due to Neisser's gonococcus.

2. That all cases originate from a gonorrheal focus, by devious paths often, but not always traceable.

3. That those parts of the conjunctival sac having a cylindrical, or a modified cylindrical epithelium, viz., the palpebral portions and that of the fornices, are the seats of election of the micro-organism.

4. That the location of the gonococcus on the mucous membrane is, at first, *super*-epithelial: then *inter*-epithelial; and still later *sub* epithelial, and all combined.

5. That its special habitat is within the pus cell yet it is also *extra*-cellular as well as *intra*-epithelial.

6. That the associated inflammation of the adjacent lid-tissues is due to the lymphatic absorption of the ptomaines of the microbe.

7. That the compact stratfield epithelial layer of the scleral conjunctiva and cornea is very resistant to the attack of the gonococcus.

8. That ocular complications are due to pressure-necrosis, producing an *infection atrium* through which the strepto-coccus, and may be the staphylococcus, find ready entrance to tissues with greatly impaired physiological resistance and often rapidly destroy them;—resulting in perforation of the cornea, *intra*-ocular infection and loss of the eye. This is a secondary infection.

9. That the therapeutical indication is the mechanical removal, or destruction of the gonococcus with its ptomaine, and that if this is done *early and thoroughly in the weeping stage*, the period of acute inflammation will be cut short and the ocular complications avoided.

10. That it is well, in the incubative stage, even without positive evidence of a gonorrheal origin, to regard with suspicion all cases of severe monocular catarrh, and *especially so in the female,—irrespective of age or condition,*—and to treat them as if due to the gono coccus.

11. That the mechanical removal of the discharges and the loosened epithelia and therewith the microbe and its ptomaine, *by thorough brushing of the palpebral conjunctiva and that of the fornices*, and ample flushing of the conjunctival sac with simple diluents or weak microbicide solutions, fulfills the etiological indication and is non-injurious in all severe cases of *simple* catarrhal conjunctivitis.

12. That of all local remedies nitrate of silver is the most potent and, at the same time, least irritating microbicide we possess. It prevents complications, and can be used in sufficient strength to destroy the gonococci without risk of injury to *intact* ocular tissues, and that solutions of greater strength than two per cent. are unnecessary.

13. That in cases, when first seen, where complications already exist, brushing of the palpebro-fornix conjunctiva should be resorted to, with thorough frequent irrigation of the conjunctival sac,—preferably with sublimate solutions up to 1–5000 If undue lid pressure exists *free* canthotomy is advisable, but *scarification of the sero-fibrino-plastic chemosis of the scleral conjunctiva does not relieve exudative pressure on the ocular tissues and it opens the doorway for secondary infection with pus microbes and is a dangerous proceeding.*

14. Where the cornea alone is inflamed the added, guarded, daily use of a bichloride solution 1–500 to the infected area is the best treatment, together with myotics, not on account of the latter's mycotic action but because, after a preliminary increase, they reduce intra-ocular tension by contracting the blood-vessels and diminishing serous exudation, and thereby they improve the nutrition of the ulcerated, softened corneal tissues. *Paracentesis* of the anterior chamber, through the bottom of the ulcer, *is called for only in those cases where perforation impends, or where positive, progressive intra-ocular infection exists.*

15. The use of a mydriatic is best limited to those complicated cases where the uveal tissues are threatened, or inflamed, because after a preliminary reduction, it increases intra ocular tension by impeding the outflow of fluids from the eye-ball, thus resulting in increased posterior pressure on the softened cornea —impairing nutrition and aiding bulging.

16. A supportive compress-bandage is antiphlogistic and of great use in preventing staphylomatous results in complicated cornea, and its use ought to be continued until the healed cornea is again unyielding.

17. Ice-cold applications check microbic multiplication and ought to be used assiduously to the end of the acute stage, or until ocular complications ensue. After the latter occur applica- ns as hot as can be borne are more comfortable, and more

conducive to the improvement of the nutrition of the impaired ocular tissues

18. As a prophylactic in monocular cases, the other eye ought to be sealed against infection, and the risks to others, from these cases, thoroughly advertised.

19. The treatment of the initial focus of infection when ascertainable in the infected subject, must be rigidly carried out on the same lines, and simultaneously with the conjunctival inflammation.

16 Laflin Street.

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ABSTRACT OF A PAPER ON

# METHYL-VIOLET, AND ITS USE IN AFFECTIONS OF THE EYE.

By DR. F. B. TIFFANY,

Kansas City, Mo.

When Methyl-violet was first introduced by Prof. Stilling it attracted much attention from medical writers. Some oculists used it with positive and satisfactory results, and added it to their list of reliable remedies; others were disappointed and discarded it, denouncing it as without merit. I tried it in some cases of suppuration of the uveal tract and got good results. I believe it was the means of saving some of these eyes. I tried it in almost all forms of conjunctival trouble, including catarrhal ophthalmia, phlyctenular ophthalmia, granular lids and purulent ophthalmia: also in cases of iritis, hyalitis, and diseases of the cornea. In some conditions I found it most efficient: in others it did nothing: while in still other conditions its use resulted in positive harm. In most forms of conjunctivitis it is not reliable. This is especially true in ophthalmia of the new born, and in other forms of purulent ophthalmia. It does no good in trachoma. In phlyctenular conjunctivitis the methyl-violet has always acted well in my hands, resulting, as a rule, in speedy cure. It is good in nearly all forms of keratitis, and especially so in that form known as interstitial keratitis. It is good in ulcers of the cornea. In suppurative iritis it has had good effect. In hypopion it acts like a charm, cutting short suppurative action. I have seen it retard a growth which I had pronounced melano-sarcoma of the choroid. I also saw it arrest a glioma of the retina, the tumor gradually diminishing in size up to the time I last saw the patient I employ this drug in the form of a solution in a strength of from $\frac{1}{2000}$ to $\frac{1}{500}$. The pomade has not been at all satisfactory in my practice.

## DISCUSSION.

Dr. Hotz:

Observations of this kind are absolutely worthless. To use a drug indiscriminately for almost every disease the eye may be afflicted with, is not a scientific experiment, but crude empiricism. Methyl-violet was introduced by Prof. Stilling under the name of *Pyoktanin*, *i. e.*, *pus-killer*, to emphasize its most prominent quality. Now if we wish to find out for ourselves whether this remedy possesses this pus-destroying power in so eminent degree, we must test its power in such suppurative affections which we know usually run a very destructive course. Serpiginous ulcers of the cornea, hypopyon, keratitis, gonorrheic conjunctivitis, these are conditions where pyoktanin can show its virtue if it has any. My tests had the following results: In suppurations of the cornea it seemed to arrest the formation of pus cells, for the hypopyon and the yellow infiltrated border line of the ulcers disappeared: but in most cases the disintegration of tissue went right on, leading to extensive softening and eventually to perforation of the cornea. In one case of incipient gonorrhea of the conjunctiva pyoktanin seemed to cut short the attack: only a mild form of simple conjunctivitis followed its use. But in other cases of gonorrheic ophthalmia and in all cases of blennorrhea of the membrane its applications were utterly ineffective. I have come to the conclusion that pyoktanin is a useless remedy. But when we are told it had cured a glioma of the retina, I believe the only rational explanation we can offer is that there was a mistake in the diagnosis.

Dr. J. H. Thompson:

Individually I have not used the Methyl-violet, but I have seen it used in several cases, and I have never seen it used but that most valuable time was lost. I have seen it used in eyes and they would be destroyed, not from the Methyl-violet but because a disease was thus allowed to run too long for any after treatment to be effective. In general surgery as well as in ophthalmic practice, such has been my observation. So I have come to the conclusion that the drug is useless.

Dr. Tiffany closing:

Dr. Hotz in his remarks deprecates the efficacy of methyl-violet in neoplasms and all forms of tumors. He says that all that is claimed for it is its value as an antiseptic. We all know that this drug, in our histological preparations, is one of the best stains that we have, taking for its predilection the nucleus of the cell. If we concede that the drug is an antiseptic, a destroyer of microbes, I see no reason why it may not in a similar way control cell proliferation of tumors and of neoplasms: at any rate, we all know that it has been extensively used not only here in America, but in Europe, and by good authority who claimed for it the power of checking, if not dissipating entirely, these growths. I am sure my experience will bear me out in all I have said in my paper.

Very recently, within the last few days, I had a case of hypopion where the anterior chamber was filled with pus in which I used methyl-violet with excellent results, clearing the chamber in a few days.

In phlyctenular keratitis I have repeatedly used it with most satisfactory results. I have been disappointed in its use where it was most recommended by Prof Stilling, namely, in most affections of the conjunctiva. I have found it most useful in the affections of the uveal tract and of different intra-ocular affections.

ABSTRACT OF A PAPER ON

# QUIESCENT FOREIGN BODIES WITHIN THE EYE-BALL WITH A REPORT OF CASES,

By WALTER B. JOHNSON, M.D.,
Surgeon to the Paterson Eye and Ear Infirmary,
PATERSON, N. J.

When the eye-ball has been penetrated by any extraneous material, the resulting injury and probable subsequent irritation and inflammation, is always regarded with the utmost concern by the surgeon in attendance.

Even if the particle comprising the foreign body is very minute, if the impact has been sufficient to cause it to penetrate the walls of the eye-ball and it has passed within the globe, it is a grave and serious condition. The prognosis is nearly always unfavorable, as it may immediately become a source of severe suppurative inflammation resulting in destruction of the eye, necessitating its enucleation, or if allowed to remain may eventually result in disease of the injured eye, or possible sympathetic irritation and inflammation of the fellow eye. Should a foreign body have entered the globe and only a moderate inflammation result the question of its possibly becoming encysted and remaining quiescent presents itself for consideration ; and unless the location of the injury and the position of the foreign body should preclude the possibility of strenuous efforts resulting in a successful termination, or delay should endanger the fellow eye, all eyes should be given an opportunity to become quiet.

The eye should be treated in all cases of foreign body with antiphlogistic medicines and applications, and general medications should be administered, when indicated, the object to be attained being the preservation of the eye-ball even though it is almost certain that the eye will be sightless. Should the possibility exist of sufficient sight being retained to render the eye of any service to the patient, the efforts to quiet it should be continued as long as there is any probability of the inflammation subsiding; for a natural eye-ball, if not unsightly or a constant menace to the fellow eye, is infinitely preferable to an artificial eye which is always a source of discomfort, and even, if most carefully matched and constructed, somewhat unsightly, in addition to being a constant expense to the wearer.

The question of the possible after-effects of a present foreign body is of importance; and the many cases reported in which even very small particles of steel have, after years of quiescence, become a source of such severe irritation that the fellow eye has become diseased, or an enucleation of the eye rendered necessary, have had a tendency towards preventing protracted efforts to save eyes which seem to be too severely injured to undergo a satisfactory reparative process. If a patient carrying an encysted foreign body can not at any future time be easily reached or may pass entirely from proper observation in case of subsequent irritation, as under such circumstances there is a decided objection to the continued presence of a foreign body in the eyeball, the desirability of efforts at its removal by operation or even, if necessary, the enucleation of the eye-ball itself should be carefully considered. The operation for removal of foreign bodies by the magnet has been performed in a large number of cases; it is, however, only moderately successful. It is an extremely dangerous operation and so serious a procedure that it frequently induces severe suppurative inflammation and subsequent loss of an eye-ball which might, under more conservative treatment, have been saved.

The time required for an inflammation resulting from the presence of a foreign body in the eye to subside is frequently a matter of great importance, especially to a patient who has himself and others dependent upon his daily labor for their support. In such a case where the time would be too long, extending over a period of weeks and perhaps months, before the eye ball would quiet, and if the eye were so severely injured that it would be sightless and there were some danger to the fellow eye, immediate enucleation would be a perfectly justifiable procedure.

The cases reported are presented for the purpose of illustrating the manner in which foreign bodies may enter the eye-ball and become encysted in different localities, remaining perfectly quiescent and apparently no menace to the integrity of the globe, the sight of the fellow eye, and even in some cases the sight of the injured eye itself.

## DISCUSSION.

Dr. Lydston:

It seems hardly just to permit the paper so ably presented by Dr. Johnson, to go by without comment at least. It seems to me that the most important feature of the subject of penetrating foreign bodies is that we do not always know whether the wound is infected. Of course, so far as the history goes it is an easy matter to present the history of these cases after we have investigated them. It has been my experience to learn that nearly all the penetrating wounds of the eye, implicating the ciliary region, are the ones most likely to set up sympathetic trouble or inflammatory trouble of varied types. Traumatism alone without the element of infection does not give rise to suppuration. Thus it has been demonstrated in regard to the cornea that it can be cut, bruised, crushed or injured in a variety of ways without exciting a purulent corneal inflammation : and we can assure that, without the introduction into the eye of a microbic element or at least one capable of chemical reaction, sufficient to light up inflammatory changes, such changes will not ensue. Therefore in the management of such cases we must always regulate our treatment by the conditions—ever bearing pre-eminently in mind the fact that the presence of a foreign body of whatever character, and whatever its site in the eye, endangers the vision of the injured eye as well as its fellow by sympathetic inflammation, irido-clycitis etc.

Finally it may be stated that if removal of the foreign body is impossible, by any measure at our command, we may experimentally wait to see what toleration the eye exhibits ; and then if we note evidence of inflammation enucleation is at once indicated.

Dr. J. L. Thompson :

The first paper was a very valuable one on the use of the Electro-magnet for the purpose of extracting foreign bodies from the vitreous. As to the second one, concerning quiescent bodies, we should like to have heard the last of that paper, without which we can say very little about it. Patients should be repeatedly warned by their physicians as to the danger of these foreign bodies. Tell them of the danger of the foreign body setting up inflammation even many years afterwards. In such cases I always give Solon's advice to Crœsus : "Count no man happy until he is dead". There are some physicians who let the poor creatures go on with these injuries, telling them "well there is not much danger" until the patient goes on and loses his other eye. If the Doctor had told him of the danger he would have been more practical and have saved his eye.

Dr. Baker:

I had the pleasure in 1882 of spending some months with Prof. Hirschburg in Berlin, and seeing him make several attemps at extractions of foreign bodies from the eye-ball with an electro-magnet. On my return home in 1882, I had a magnet made, an improvement on his in that it would lift five or six pounds while his would only lift ten or fifteen ounces.

We have in Cleveland, as in all manufacturing centers, a number of penetrating wounds of the eye-ball. It is always a difficult problem to know how to best treat these cases, and the electro-magnet has been of much value to me in making a diagnosis. In a few cases it has proved of great service in the removal of fragments of iron or steel from the interior of the eye-ball.

I recall one case referred to me by the late Dr. Weed, in which he supposed the injury was only conjunctival and put a stitch in it. There was hemorrhage in the anterior chamber which obstructed the view with the ophthalmoscope.

As soon as I brought the electro-magnet near the eye-ball I knew there was a foreign body in it, by the way in which the ball followed the magnet, and the pain complained of by the patient. I opened the wound, and by the aid of the magnet, soon found and removed the piece of steel which was about the size of my little finger nail. The man is still carrying that eye without any vision, but it looks as well as the other.

In another case, I could see a piece of something, not much larger than a pin head, very distinctly in the center of the vitreous. I made an opening in the chamber opposite and inserted my magnet repeatedly. I could hear the click of the instrument against the foreign body, but it would not come out. I kept this up for a long time but could not get it. After consulting with the patient we decided the eye must come out.

I enucleated the eye and upon opening it, took the magnet and placed it in contact with the foreign body but could not extract it. I could lift the entire eye-ball with this piece of steel adhering to the magnet, and yet it would not separate from the vitreous. The inflammatory capsule held this piece of steel there. Could I have permitted that foreign body to remain without harm? I had another case not very long ago who had a piece of steel in his eye eight years. After that long time of quiescence it set up sympathetic inflammation and caused the loss of the fellow eye. I do not like the term "quiescent foreign bodies in the eye". I do not think it best to convey the idea to the mind of the general practitioner that he can safely leave these foreign bodies in the eye. It might do if we could have them under our own control, but it is not well for us to let them go out from under our care with these foreign bodies in their eyes.

[*This discussion will be continued in next issue.—Editor.*]

# THE OPHTHALMIC RECORD,

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## MONOSCOPTER.

In giving the derivation of the above word. in our last issue, there was an error in the second Greek word—*tau* should have been *epsilon.* The Greek word will be correct in our forthcoming little book.

## THE INTERNATIONAL MEDICAL CONGRESS

Has again been postponed, if newspaper reports are true. The Congress will be held in April of next year. This postponement will, doubtless, add largely to the attendance on the meetings of the Pan-American Congress.

## DR. C. D. ROY

Who has recently returned from Europe, where he devoted much time to the study of the eye, has been elected Professor of Ophthalmology in the Southern Medical College, Atlanta, Ga. We wish him success.

## SECTION OF OPHTHALMOLOGY, PAN-AMERICAN MEDICAL CONGRESS.

On pages 55, 56 and 57 of this issue we publish a list of the papers to be read at the Washington meeting in September. These papers, together with the discussions that will be brought out by them, will largely repay the Oculists who may go to Washington.

## A NEW COLLEGE

Has been organized in Richmond, Va , under the name of College of Physicians and Surgeons. Dr. J. A. White has been elected Professor of Ophthalmology, and Dr. John Dunn has been elected Professor of Laryngology, Otology and Rhinology. Dr. White is also Secretary and Treasurer of the Faculty. We wish our friends White and Dunn much success in their new undertaking.

## DR. J. E. MINNEY'S PAPER

In this issue will be read with interest. In this connection we may be pardoned for saying that, at the request of Dr. Chisolm, President of the Section of Ophthalmology, Pan-American Medical Congress, we have prepared a paper on the "Necessity for the Suspension of the Accommodation by means of Mydriatics in Refractive work." We verily believe that the necessity exists; and in this paper, which will be published in full in a future issue of this journal. we propose giving our reasons for so believing.

## EXOPHORIA.

In the exercise treatment of exophoria the prism method is often more effective, and gives less trouble to the patient, than the wax taper method. While many patients improve from the beginning, and continue to improve, under the wax taper method, we have been forced, in some instances. to change to the prism method and good results have followed. Having set forth in No. 11, Vol. 2, of this Journal, the principel of exercise in all forms of Heterophoria, we propose leaving to others the reports of cases treated. We solicit such reports, promising to publish them in as early an issue as possible after receiving same.

# Department of Otology, Laryngology and Rhinology.

GEO. H. PRICE, M. D., EDITOR, 621½ Church Street,
NASHVILLE, TENN.

## A CORRECTION.

In Vol. II., No. 12, appears an article on Disease of the Mastoid, by Dr. Stephen Dodge, of Halifax, Nova Scotia, to which we desire to call attention. The case reported in this paper, is of unusual interest, from the fact that the recovery of the hearing of this patient was remarkable, and to this feature we call special attention since, in the issue above mentioned page 481, line 17, we have made it appear that the patient could hear a whisper at 15 *inches*, when in fact it should have been 15 *feet*. Later she heard a whisper at 20 *feet* instead of 20 *inches*, as noted in line 6 from the bottom of the same page.

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## A CASE OF SUPPURATIVE OTITIS FROM THE FRACTURE OF A SPICULA OF BONE FROM THE LOWER JAW.

BY F. D. GREEN, M.D.,
PUEBLO, COL.
Member Colorado State Medical Society, Etc.

On March 20th, 1893, Dr. Rice referred to me a patient suffering with Suppurative Otitis Media, giving the following history:

Richard G., aged 60, living near Cañon City, while riding from some quarries carrying some drills, his horse became frightened and threw him. He was considerably stunned from having fallen on his face, but got up and walked home.

About Feb. 10, he began to suffer considerable pain in his right jaw, but thinking it caused by bad teeth, allowed it to run on until early in March, when he went to Cañon City and consulted a Dentist, who extracted several jaw teeth from that side. He continued to suffer, and on the 14th of March his right ear also commenced paining him severely and on the 16th, commenced discharging. He came to Pueblo on the 19th, and on the 20th, when I first saw him, was still suffering intensely.

On examining the nose and pharynx, I found them normal and on questioning him, could get no history of a cold.

On syringing the ear with a warm boric acid solution, the fluid passed through the eustachian tube and out the nostril, showing it to be perfectly patulous. As he still complained of pain in the jaw, I asked to see his teeth and observed a fistulous opening where the canine should have been, discharging a fœtid pus. Thinking there was probably an old root present, I sent him to a dentist who made an incision and removed a spicula of bone, three-fourths inches long by one-fourth inch wide, which had in all probability been fractured from the jaw by the fall in January.

The pain in the ear and jaw ceased almost immediately, and on the next morning the discharge had ceased. In a few days the tympanum had healed and hearing was much improved.

234-235 Central Block.

# EAR COUGH.

By A. G. ALDRICH, M. D.,
Anoka, Minn.

Too often neglect of detailed examination leads to diagnostic errors and unsuccessful treatment, when symptoms are directly manifested ; and far too often does this occur when disorders at remote points are manifested through the reflexes.

It is believed that the occasions are infrequent when the aurist should be consulted for the explanation of cough. This I believe to be true, but that there are more cases than generally observed, I also believe to be true. During the last thirteen years of general and special practice I have in many cases found it quite impossible to examine the ear without exciting a cough, the pressure of the speculum alone many times causing quite a paroxysm of coughing. I have also observed many cases where inflammation of the auditory canal has kept up an irritable cough which has subsided upon the proper treatment.

One very interesting case of ear cough which I wish to report, in order to add to the literature upon this subject, is that of Mrs. L., a clergyman's wife, who consulted me in June, 1886, for deafness of the right ear. I observed during the consultation that she suffered from a harsh rasping cough. She informed me that she had been coughing for a year and had consulted several physicians, each making a different diagnosis, and that at the present time she was under the care of a gynecologist who pronounced it of reflex uterine origin. Upon inspection I found the auditory canal filled with what seemed to be inspissated cerumen. I succeeded in removing the mass which I found to be a cockroach entirely incrusted with cerumen. Her deafness was of course relieved, the cough ceased immediately and has never returned. I think it advisable in all cases of intractable cough of apparent unknown origin, to which is applied that vague and unscientific appellation "irritable cough," that the auditory canal should be examined. I have observed that most individuals suffering from ear cough have been neurasthenics, but as in reflex affections of other organs, where the cause seems skeptically slight, so in this affection we must give due attention to the reflexes of aural origin. The exciting cause in all cases coming under my observation has been pressure causing irritation. Opportunities for studying aural reflexes have been very limited for specialists in otology, as the cases fall more frequently into the hands of the general practitioner. The subject is not, nor will it ever be, as voluminous as that of some other reflexes, but it is interesting and will add its mite to the general study of reflex phenomena.

THE

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# THE STUDY OF OPHTHALMOLOGY IN EUROPE.

Written for the Ophthalmic Record by
C. D. ROY, M.D.,
Professor of Ophthalmology in Southern Medical College,
ATLANTA, GA.

The question has often been asked: Are the opportunities for the study of medicine in Europe superior to those afforded in America? The answer to the same has by no means reached a point of perfect unanimity. In the same manner as above might be asked the question about ophthalmology as one branch of our medical science. It is not my intention in this short article to answer either of the above; but, at the request of the Editor, I shall give a few thoughts that occur to me in regard to ophthalmology as taught in Europe, that is, in so far as it has been my opportunity of late to observe. One is surprised at the number of American students, especially in medicine, whom he meets abroad; and Vienna, in particular, seems to be the central point for this mighty concourse. The question might be pointedly asked. Does it warrant a man in going to a country for instruction where he is unacquainted with the language used? This latter question is one of importance and one to which due consideration is seldom given, when contemplating a trip abroad for the purpose of study. But a still more poignant question is, whether it is necessary at all for one to go to Europe for the study of ophthalmology: or whether he cannot obtain at home the instruction necessary for the *thorough understanding*, not the *practicing*, of this branch of medicine. The answer to the latter might well be a simile to the old dictum that it does not depend upon the school so much as upon the man, as to the amount of knowledge gained. Methods in teaching differ with individuals of the same nationality: and what is true of individuals is true of a nation. The success of any teacher depends upon his own personal equipment in the first place, and in the second, to certain external environments which will enable him to impart this knowledge of his in a manner satisfactory to himself and beneficial to his listeners. In Europe the methods of instruction in ophthalmology, and the opportunities afforded to the American student, vary with the notionality. To study in any country with success, the student must remain long enough to acquire a practical mastership of the language. It is true that one can see and understand a great deal, even though he be unacquainted with the speech, but it is far more profitable to know the whys and wherefores of everything that is seen. For the study of ophthalmology, Germany, likewise Austria, to my mind offers the best advantages to the American student, and such others who may wish to have a thorough knowledge of this branch of our medicine. To give my reasons for so thinking is not the purpose of this article: suffice it to say that as the home of deep and broad minded thinkers, the same broad principles are adhered to in all their teachings.

In all the Medical Universities, the study of ophthalmology receives as much attention as any of the other branches of medicine: my views are based, however, upon observations made in Leipzig and Vienna, and as such cannot necessarily embrace all the Universities; but the same thoroughness of instruction, I am sure is exercised throughout. Every student of general medicine is a constant attendant upon the lectures in ophthalmology; for not only must he stand a most rigid examination upon the same, but he must also write a graduation thesis upon some subject he may choose.

Students attend every day, either a didactic or a clinical lecture, and besides this instruction received from the regular Professor, they also avail themselves of private instruction in courses given by regular licentiates of the University, and usually men of decided standing in ophthalmological work. For instance, besides the regular lectures given by Prof. Sattler, in the University at Leipzig, his first assistant gives private courses on refraction, the ophthalmoscope and external diseases of the eye. These latter are most beneficial, and in fact are the courses from which a student receives the most practical advantages. An American student who wishes to study ophthalmology cannot receive a diploma on that particular branch, but it must be included in the regular medical diploma from the University. What they usually do is to matriculate, and thus be allowed all the advantages of a regular student in the way of attending the lectures, and taking all the private courses. It is these private courses which make the study of ophthalmology so perfectly instructive, since the number in them is limited and each member receives personal attention. These are the courses that have given Vienna such a prominent place in the minds of the American medical student, as being the best place in all Europe for the study of any specialty. The men who give such courses as these, are men of recognized ability, and men especially fitted for the teaching of a certain branch of ophthalmology. For instance, one man gives instruction in the use of the ophthalmoscope, with the presentation of cases representing the various diseases of the fundus: another, who is well known for his work in refraction, gives daily instruction in this special line; while others, equally as prominent, limit themselves to the external diseases. And so it goes throughout the domain of ophthalmology; and a student is thus enabled to obtain just the work he wants, with the advantage of being in a course limited in numbers, which in itself offers many inducements.

There is one especial feature of ophthalmological work in Germany, which is of paramount importance, and that is the time given to the labratory work on eye pathology. This latter subject is too much neglected in our own American schools, a method of instruction which alone will give the student a thorough anatomical knowledge of the subject studied, and a thorough understanding of the pathology of ocular diseases. Each Professor has his own labratory, most thoroughly equipped for the prosecution of this line of work; and it is the opportunity for such work as this which makes the study of ophthalmology abroad so valuable.

These German methods of teaching, and the advantages and opportunities they offer, cannot certainly be commended too highly.

I cannot speak so definitely of ophthalmological work in France, as it was not my pleasure to remain long enough in Paris, for the prosecution of studies in this branch. It was my pleasure to meet, and to visit the clinics of, most of the distinguished ophthalmologists of that city; but my stay was not sufficiently long to allow me the expression of an opinion, one way or another, upon ophthalmological work in that city. In London, advantages for ophthalmological work are many. My idea is, if a man is sufficiently well grounded, and simply wants a clinical experience, that London offers the best advantages to such. The trouble in London is, that the material is so large that the men either do not have, or at least do not take, time to give any personal instruction. At the Moorfield's Ophthalmic Hospital, a man can spend the whole morning in witnessing operations, and in seeing all manner of ocular diseases; but then he must be sufficiently well up to appreciate what he sees, as explanation of the cases would be almost impossible with such an immense amount of material as was daily present.

Ophthalmology as taught in Europe differs but little from that as taught in America. The same foundation principles exist everywhere; the only difference is that certain countries, like individuals, are wedded to certain fads and fancies of their own. It is certainly true that Professors in the Universities and Directors of the Ophthalmological Clinics give more time and attention to this work than we do in America. In Germany the money made by a Professor comes from his position in the University; and private practice is but of a secondary consideration; while with us—must it be said?—it is just the reverse. But the order of things is beginning to change, and soon we shall find that America offers as many opportunities and as thorough training in ophthalmological work, as can be found in any European city.

The study of heterophoria or the relationship of the extrinsic muscles of the eye, has by no means received that degree of study and consideration in Europe that the same has in America. The reason perhaps is that the phlegmatic European is not affected by those forms of muscular insufficiency which, in the case of the sensitive, high-strung American, is the cause of so many complaints which ophthalmologists have found to have this common origin.

The fact is that our colleagues across the waters have not given this subject the proper study which it deserves. The old Von Græfe test for muscular insufficiencies, is the only one seemingly known of importance; and even that is but little used, for they seem to lay but little stress on to the various forms of heterophoria as a causal factor in many ocular troubles. I was greatly surprised to find that such was the case; and yet, unless the error could be seen by ocular inspection, but little attention was paid to muscular tests. Graduated tenotomies had been heard of, but by them they were regarded as a foolish procedure. In going to M. Nachets' establishment, with a friend of mine who wished a trial case, I asked him if the case was complete with the Maddox rod and double prism; but I soon found that I had to explain what they were, as this learned French optitian seemed in perfect ignorance of their existence. Even though the rod test was a production of a fellow countryman, I found that, in London, it was seldom used and, as everywhere else, but little attention paid to muscular errors.

I should indeed feel that my examination of any refractive case was very incomplete, if I did not ascertain the true condition of the extrinsic muscles. After all that has been said, a student will find that he learns many things in America, which he cannot obtain in Europe.

# GLIOMA OF THE RETINA.

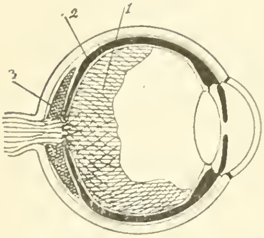
Written for the Ophthalmic Record by

By H. MOULTON, M.D.,

FORT SMITH, ARK.

The following case was referred to me by Dr. O. M. Bourland, of Van Buren, Mch. 6th., 1893. In a child aged 5 yrs. blindness of the right eye was discovered about a week before. There was an indefinite history of previous inflammation about the eye, which had passed off at the time I saw it. The pupil was dilated, tension normal, and vision nil. From behind the pupil came a pearly white reflex. The ophthalmoscope showed a white irregular growth within the fundus, most prominent below. The choroidal reflex was entirely absent. The previous history of inflammation made me cautions about a positive diagnosis, but the age and *peculiar* reflex inclined me to the opinion of glioma. Although we are advised in case of doubt between glioma and inflammatory choroidal exudate, to enucleate promptly, the eye being useless in either event, I yet felt inclined to wait. The parents were reluctant to consent to an operation. And the sacrifice of a good looking, though sightless, eye-ball in a child is no trifling matter. But when six weeks later it was evident that the growth was approaching the crystalline lens, without inflammation, and that the tension was increasing, with a dilated pupil and without the funnel shaped iris, it became evident that we had a glioma to deal with.

Accordingly, on the 7th. of May, assisted by Dr. Bourland, I removed the eye, taking with it about one half inch of the optic nerve. The orbital tissues being intact the wound was now closed. The diseased organ was placed in Müller's fluid to harden, and sections for the microscope were afterwards made by Dr. E. G. Epler of this city.



The growth, as shown at 1 in the cut, filled one third of the cavity of the globe was found to consist of small round granular nucleated cells, in a fine and scanty fibrous matrix. The choroid (2) was free from exudate and occupied its normal relation to the sclerotic, except in the vicinity of the disc. Here a most remarkable condition was found. Intimately connected with the optic nerve fibers and spreading out between the choroid and sclerotic, was a circular plate of tissue (3) .15 mm. wide and from .01 to .02 mm. thick. This tissue was quite dense, and under the microscope presented the same appearance of granular nucleated cells that the retinal growth did, except that the fibrous stroma was much more compact and firm. I take it that the glioma first developed in the retina and extended along the nerve-fibre layer to the entrance of the nerve where a secondary tumor was developed. The consistence of each was determined by the parent tissue, and the shape of the last by the resistance of the choroid in front and the sclerotic behind. The antra-ocular portions of the nerve were healthy, excepting just at its entrance through the sclerotic, where there was slight infiltration. Thus the anatomical diagnosis was the same as the clinical; and the prognosis, duly guarded, is favorable.

## The Scientific Proceedings of the Section of Ophthalmology of the American Medical Association, at the Milwaukee Meeting, June, 1893.

*Continued from page 75, current volume.*

## DISCUSSION.

## OF THE PAPERS OF DRS. BARCK AND JOHNSON.

Dr. Heustis:

In the paper by Dr. Barck the cases seem to be of an acute nature; and the cases reported by Dr. Johnson of a chronic nature. I would like to ask how long a time they would feel justified in letting lapse, after an injury, before removing the foreign body from the vitreous? There is such difference of opinion I would like to hear from both of them on this subject.

Dr. Murrell:

I had occasion to present a paper last year on the subject of sympathetic troubles and how to deal with them. In reference to the first paper I will say that my experience with the electro-magnet has not been satisfactory. I have tried it in a few instances and have always failed to save the eye. The foreign body is usually tangled up in the fibers of the vitreous. I have had two or three typical cases and in each have failed and had to remove the eye afterwards. In reference to quiescent bodies in the eye, I think it is a very dangerous thing to leave them in position. Of course, we know that injuries in the uveal tract are most liable to give rise to sympathetic trouble; but even in the vitreous humor there is danger of sympathetic trouble following, if the foreign body cannot be removed from the eye. I have seen a number of cases where foreign bodies have been carried a number of years and then have sympathetic inflammation set up in the other eye. I treated an eye with a piece of glass in it that had been carried for ten years. The piece of glass measured more than half an inch and had very sharp edges, sharp enough to cut. It had cut transversely through the cornea into the sclera about four millimeters on either side. It was evidently in the cilliary body, yet it was carried ten years without the slightest trouble. However, I advised the removal of the eye because the patient was blind and as a safe guard. On opening the eye I found the piece of glass. As Dr. Thompson has said, the patient is better without that eye than run the risk of carrying it.

Dr. Jackson:

The case reported by Dr. Baker, in this discussion, brings out a feature I do not remember to have seen mentioned, as to the use of the magnet in extracting foreign bodies from the vitreous. A foreign body can be dragged through the vitreous with very great difficulty, or not at all, by the magnet, unless you drag it through the wound of entrance. In one case I saw thirty-six hours after the foreign body (quite a small particle of steel) entered: the wound of entrance being small, and the foreign body lodged on the other side of the eye, a wound was made at the outer side of the vitreous chamber. Inserting the magnet, which was working well, it was tried repeatedly to drag the body out. The instrument would come in contact with the foreign body but it was impossible to dislodge it. So in Dr. Baker's case, he tells me, he had made a new wound of entrance through which he introduced the magnet, and not through the wound made by the foreign body. This perhaps has been more frequently the cause of failure than has been noted. I think it much safer to have the foreign body out of the eye if possible; but the large majority of these cases that do well after the magnet extraction are probably cases which might have done well had the foreign body remained in the eye.

Dr. Frank Allport:

In regard to the use of the electro-magnet, my experience has been rather unfortunate. I have, upon several occasions, extracted foreign bodies from the interior of the globe, by the use of the magnet, but have subsequently lost the eye. The intra-ocular manipulations of the instrument has seemed to be more than the eye could endure.

I would not however condemn the use of the magnet. Good results *are* reported and I may have been unskillful in the operations. It should certainly be used in cases of superficial lodgment of foreign bodies, that are beyond reach by other methods. But I should have to be absolutely *sure* of the presence of a foreign body inside the eye-ball, to make any more experimental intra ocular searchings, with an electro-magnet.

In regard to quiescent bodies in the eye, I feel convinced that there is no safety, while a foreign body is in the eye, and that, if its extraction is impossible, the eye should be removed. There are eyes that carry foreign bodies for years, and then produce a loss of both eyes.

It is not conservative practice to allow patients to take such chances. These patients are usually laboring people of a low order of intelligence, and are apt to wander from one part of the country to the other. A sympathetic inflammation is liable to occur at any time, under the most adverse circumstances, as to skillful surgical attendance, etc. The loss of one or both eyes will be the probable result. We should do our duty, and advise the enucleation of an eye, where we are sure of the presence of a foreign body, before the patient passes from under our observation. In this connection, let me advise some concerted action, with regard to enforcing legislation, calculated to prohibit the manufacture and sale of toy guns and pistols.

In the month of June I was compelled to remove no less than three eyes, from children who had been playing with these mischievous playthings. During the same month, a medical friend of mine in Winona, Minn., was forced to mourn the loss of a young son, killed while playing with one of these dangerous instruments.

If our wise legislators would drop for a time the discussion of such burning subjects, as the smoking of cigarettes, the draping of nude statues, the covering of similar pictures, and the wearing of hoop-skirts, and direct their attention to the advisability of permitting the manufacture and sale of toy guns and pistols, they would fill a long-felt want.

Dr. Frothingham :

I wish to discuss briefly, two points that have been presented. The first is the statement that has been made by a previous speaker, that if a foreign body has entered the eye and we can not remove it, we should enucleate the eye at once, without regard to other conditions. I do not think experience warrants so "hard and fast" a rule as that. While, in the great majority of cases, enucleation will be necessary sooner or later, we should not decide the question of enucleation alone upon the fact that a foreign body is lodged within the eye, but upon the amount of injury and the reaction that follows, that is, upon the symptoms of an inflammatory nature in the injured eye that indicates danger to the other eye through sympathy. We all know that foreign bodies may remain in the eye for years without causing any feeling of discomfort or endangering the other eye. I once had a patient, an aged gentleman, who suffered from senile cataract. Many years before, while he was a young man, he had a piece of steel enter the eye and lodge in the upper portion of the iris, where it had become encysted, and, after a brief period of irritation, had never troubled him in the least; and the vision had remained perfect until the senile cataract commenced to form. As the cataract was mature in this eye, I operated, and in removing the usual section of the iris, I removed the foreign body also. There are many instances where foreign bodies have remained in the deeper sturctures for many years without producing any symptoms that indicated enucleation of the injured eye.

I had a patient, a young man, come to me suffering with pain in a blind eye, and sympathetic irritation of the other. The painful eye had been blind from childhood, but, until a short time before consulting me, it had caused him no discomfort· There was an injury of the iris, an absence of the lens, and a small scar of the cornea which indicated that a foreign body had penetrated the eye long before. He was then twenty-six years of age, and said he had never received any injury of the kind. The eye was enucleated and a small piece of steel was found lodged upon the inner surface of the sclerotic. The patient afterward recalled the fact that when a small boy, about six years of age, he was watching some men while they were drilling a stone, that something struck him in the eye, causing pain. This was a case where a foreign body had penetrated the eye, and yet, not until about twenty years afterward did it give rise to symptoms that called for its enucleation. This patient made a perfect recovery.

Now there is a sufficient number of similar cases on record to forbid the acceptance of a rule that we should enucleate an eye at once if a foreign body has entered it, and we can not remove that body. If all symptoms of iritation speedily subside, and there is no recurrence of pain, or feeling of discomfort in the injured eye, and the other is unaffected in any way, we are justified in waiting, and under certain circumstances should wait until symptoms of pain and irritation recur in the injured eye, and indicate danger to the other, through sympathy. We should never allow a patient to go without warning, and should fully impress him with the danger of delay after symptoms of irritation recur in the injured eye: and in all cases where the recovery from the effect of the injury is not steady, and of short duration, we should enucleate.

I remember a case something like the one reported by Dr. Baker, The patient, a man of intelligence, had a small bit of steel penetrate his eye a few months before I saw him The vision of the eye was not greatly impaired and there was, on first examination, but little indication of irritation or danger to the other eye: and I thought the patient was perhaps unduly alarmed, and I hesitated to sacrifice an eye that possessed so good vision, until thoroughly satisfied that it was necessary. Upon ophthalmoscopic examination, the position of the foreign body could be plainly made out in the posterior portion of the vitreous humor, where it seemed suspended and surrounded by a thin film of semitransparent tissue. I kept the patient under observation in the hospital, and finding that there were well marked symptoms of iritation at times which prevented his use of the other eye, I decided to make an attempt to remove the foreign body, and failing in this, to enucleate the eye. Having the patients consent, I had him put under the influence of an anesthetic, and, making the usual incision, tried with a powerful magnet to extract the foreign body, but without success. I then enucleated the eye. I then opened the eye, and with the foreign body plainly in view, and the magnet brought as close as it could be, I was unable to move it, although there seemed but a very slight change in the vitreous surrounding the metal.

Dr. LeMond:

I do not think there is anything more in keeping with conservative ophthalmology than to enucleate the eye-ball if any sympathetic irritation is present.

A few days ago, at my home, in Denver, on the day I was preparing to start for Milwaukee, a gentleman came to my office who had an injured eye. The ocular injection was very great, and inflammatory action had gone to a considerable extent. The well eye I noticed, on examination, was wanting quite a little in power to accommodate. He said to me "I came to get some medicine for my eye." I examined it carefully and finding that it had been caused by the introduction of a foreign body, I told him he was running a considerable risk in allowing the affected eye to remain in its orbit; and assured him that he had a sympathetic irritation in the well eye, which was likely to produce total blindness, unless attended to at once. The affected eye looked phthisical, the tension was minus and the vision was entirely gone. I said: "I will enucleate the eye for you, if you want it done, otherwise I will do nothing." He went away but soon returned and informed me that he would take my advise and have the operation performed. On opening it I found the remains of a foreign body.

About three years ago a lady came to my office and said: "Doctor, I have come to get something to allay this inflammation in my eye." It had never given her such trouble before. It was brought about by the introduction of a small piece of thorne which pierced the ciliary body. I told her I would enucleate the eyeball by all means, as she was beginning also to have sympathetic trouble in the well eye, and that I could not be honest in advising her to try to hold on to the injured eye longer, as it would be running a risk that I would not carry for $1,000.00 a day. She refused to abide by my advise and went away. In three months she returned, and I found that the injured eye had recovered, to a great extent, from the introduction of the foreign body, but on examining the other eye, alas! I found that it was, too, in total darkness. Had I advised this woman at her first visit to me, to have pursued the course she did, my conscience would haunt me to this very hour for not having done my duty. I do not say to do a wholesale enucleation, for every foreign body: but wherever sympathetic irritation has manifested its presence, I never fail to advise enucleation, and I have got the first case to regret for having taken such a course.

I do not think we act wisely by attempting to carry these risks. This case is only one of a dozen, or more, that have come under my own observation with like results.

Dr. Hotz:

Prognostically it makes a vast difference whether the foreign body in the eyeball is lodged in the vitreous, or in the lens, or in the iris. General statements, therefore, on foreign bodies in the eye without mentioning the location must be misleading; for instance, when a gentleman said it was his rule to take every eye out, in which he found a foreign body, he certainly did not wish us to believe he would enucleate eyes having a foreign body in the iris or lens; for these foreign bodies may either be left *in situ* or can successfully be removed and the eyeball saved. But conservative treatment cannot be reccommended for foreign bodies in the vitreous. The experience of all oculists, at all times, has been that foreign bodies in the vitreous are a prolific source of sympathetic inflammation. Such eyes are a constant menace to their fellows and should be removed; for we have no right to jeopardize the sight of thousands of eyes by a conservative treatment, because, in some rare exceptions, it has proved satisfactory. We must not be guided in our actions by exceptions but by what our experience of every day shows to be the usual course with such cases.

### ABSTRACT OF A PAPER ON

# MENINGITIS FOLLOWING ENUCLEATION OF THE EYE-BALL.

By S. D. RISLEY, M.D.,
PHILADELPHIA, PA.

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John M., prematurally old, but aged forty-seven, presented himself at the Wills Eye Hospital, Dec '92, with an obscure form of iritis. Blood clot in the anterior chamber, tention normal, vision quantitative, light perception; with hemicrania, much depression of general health. Was treated with local blood-letting, and calomel and soda purge. Special house diet. Under this he rapidly improved but there were recurring attacks of hemorrhage in the anterior chamber with increased tention and return of the general impairment of health, the mental depression at times amounting to melancholia. During one of the intermissions of acute trouble a broad iridectomy was made upwards, which was attended with severe hemorrhage. Wound refused to heal, and in two weeks the eyeball was enucleated. There was no reaction, stump healed without suppuration, and the man's general health rapidly improved. On the fourteenth day was discharged from the hospital apparently well, certainly with nothing to lead one to anticipate serious after-trouble. In one week (Feb , 15th.) he sent for his family physician, who found him in a condition of health every way similar to attacks which had been witnessed while in the hospital. No albumen in urine, no suppuration of stump; but the condition deepened once more into that of melancholia, and finally into pronounced cerebro-spinal meningitis from which the man died on the twenty-fifth day after enucleation, having remained in a state of opisthotonos for four days. No autopsy. The examination of the eyeball, miscropically, revealed a pan-ophthalmitis, the eyeball being filled with pus. A review of the literature showed forty-six cases of meningitis following enucleation of the eyeball, only half of which had shown suppurative pan-ophthalmitis, and forty-two of which had proved fatal. The opening of the eyeball seemed to be of far more importance than the presence of visible pus, since in 75% of all the cases in which this point was mentioned the eyeball had been opened either by opperative interference, accident or ulceration.

### ABSTRACT OF A PAPER ON

# A CASE OF SYMPATHETIC NEURITIS AFTER EVISCERATION.

By F. C. HOTZ, M.D.,
Chicago, Ill.

A young man, twenty-one years old, had lost the right eye in early childhood. Dec., 1888, the atrophied globe had for the first time become irritable, red, tender and during this paroxism the left eye was more or less sensitive to light and reading. These paroxisms occurred every summer, while during the winter the patient was free from trouble. In Aug., 1891, this sympathetic irritation had again become very annoying, so that the patient readily consented to an operation for its relief. The sight of the left eye was perfect, its fundus normal; but there was photophobia and accommodative asthenopia. Aug. 10, 1891, evisceration was performed under strictly aseptic precautions. The eyeball was opened by a circular incision just behind the sclero-corneal border; the retina was found completely detached and "chorded"; the choroid partly calcareous, could easily be separated from the sclera. After a careful removal of the contents the inner surface of the sclera was washed with strong carbolic acid and dusted over with iodoform; then the conjunctiva was closed up by a purse-string suture; and after another washing with sublimate, a binocular bandage of borated cotton was applied.

The left eye was at once relieved of the symptoms of sympathetic irritation. But the operation caused a very violent reaction; severe right-sided headache for a whole week; edema of the lids lasted ten days and the chemosis of the conjunctiva persisted for over two weeks; and all this time the stump was tender to touch and the patient had a constant dull deep-seated pain in the right orbit. Seventeen days after the operation (Aug. 27th.) the patient noticed a peculiar unsteadiness of vision: he could see an object perfectly well at first but in a few seconds it would become dim The eye also began to be sensitive to light again, and pressure upon it caused a a painful sensation behind the eyeball. The optic disc appeared hyperemic and in the next four days its outlines became decidedly veiled and the adjoining retina hazy; and the sight gradually dropped to $\frac{20}{80}$. This condition lasted one week: no change was observed until the tenderness of the stump and the orbital pain had been completely relieved. Then the left eye rapidly improved and recovered normal vision, and a normal appearance of the fundus.

The history of this case leaves no doubt that the left eye had been affected by sympathetic irritation: but this was promptly relieved by the operation; and as sympathetic irritation never leads to inflammation, the subsequent neuritis cannot be regarded as having had its origin in the conditions preceding the evisceration. But the operation was followed by violent inflammation in the orbit; this inflammation probably followed the optic nerve of the right eye up to the chiasm where it passed over to the optic nerve of the left eye and, decending along this tract, reached the left eyeball. In this way the optic neuritis of the left eye is directly traced to the eviscerated right eye; and as such violent, prolonged inflammation is no unusual occurrence after evisceration the operation may, in any case, lead to similar sympathetic inflammation, and therefore must be regarded as a less safe operation than enucleation.

It has also been shown that fatal cases have occurred after evisceration; therefore the claim of its greater safety in this respect is not sustained, and even the alleged better conditions for the movements of the artificial eye do not exist in reality. Perimetric measurements of the apparent lateral movements of the glass eye, worn after evisceration or enucleation, show no different results.

But while evisceration can claim no particular advantage over enucleation, it compares decidedly unfavorably with enucleation in the after-effects. After enucleation patients seldom suffer much, and get well very quickly; after evisceration they usually suffer very much and get well very slowly.

## DISCUSSION.

Dr. Gifford:

I think it should be noted that, in Dr. Hotz' case, the evisceration was performed in the manner advised by Græfe, the wound being closed with a tobacco-pouch stitch. This I consider an unfortunate practice. I have been doing eviscerations for a number of years, at first, closing the wound with a stitch as Græfe recommends. Where this was done, the reaction was generally so great, and so out of proportion to the severity of the operation, that I was inclined to abandon it altogether. Reflecting, however, on the difficulty which has been shown to attend a perfect sterilization of the conjunctival sac, I decided to treat the wound as one which could not be relied upon as aseptic, and instead of closing it, I packed the scleral cavity loosely with iodoform gauze, after stopping the bleeding and dusting in iodoform freely. The gauze was removed on the second day, and the reaction combatted with hot applications. This plan I have followed for the last four years, and while there is apt to be much swelling after the gauze is removed, the pain, which is so severe when the wound is closed, is either absent or insignificant. The plan of Dr. Prince, to fill the cavity with iodoform, would, I have no doubt, accomplish the same purpose, so far as reducing pain is concerned, but as Prince, himself, says that it sometimes takes months for the healing to be completed, I have not felt like adopting his method. Now I think it is evident that with the slightest infection of the cavity, the chance for a sympathetic inflammation must be greater if the wound be closed than if it be packed and afterwards be washed out with peroxide of hydrogen till it heals from the bottom. Another point which should be noted, is that the neuro-retinitis, reported by Dr. Hotz, was but transitory, recovering spontaneously; indicating that it was not a true infectious neuritis, such as we get as a forerunner of the severe plastic irido-choroiditis, which we call sympathetic ophthalmia, but merely a toxinic inflammation caused probably by the carrying over of toxines, by diffusion or otherwise, from the operated eye.

Dr. R. A. Reeve, Toronto:

As the object of evisceration is mainly to secure a better cosmetic result then that had by enucleation, I have practised one or two modifications of the method of operating laid down in the books, in order to lessen the reaction and secure a better stump. Departing from the rule given, to irrigate thoroughly with an antiseptic solution until all bleeding has ceased and no clot remains, and then to seal up by stitching the conjunctiva, I have simply eviscerated without irrigating, in ordinary cases where the contents of the globe are practically aseptic, and have stiched the scleral edges together with the eye full of blood. One can rely on the germicidal action of the contained blood-clot: and the bulb is free from the danger of infection from without. Unfortunately, the large stump obtained is apt to shrink more or less in a few weeks.

I may add that for a number of years it has been my rule, with few exceptions, to enucleate in cases of pan opthalmitis, and I have never seen other than good results. In two cases of death after enucleation. not for pan-ophthalmitis. seen by me in consultation, the lethal result did not seem fairly attributable to the operation, nor is it generally so in my opinion.

In the matter of sympathetic ophthalmia, writers still lay stress on the absence of invading organisms, whereas, the pathalogy of tetanus alone should suffice to show that their actual presence in the sympathising eye is wholly unnecessary.

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ABSTRACT OF A PAPER ON

# INTRAOCULAR INJECTIONS OF SOLUTIONS OF VARIOUS ANTISEPTIC SUBSTANCES: AN EXPERIMENTAL INQUIRY.

By G. E. de SCHWEINITZ, M.D.,
Philadelphia, Pa.

Dr. de Schweinitz, after referring to the researches which have been published, concerning the effects of the introduction of various substances, solid and liquid, into the vitreous chamber, divided them as follows:

(1) The introduction into the vitreous of foreign bodies (pieces of wire, lead, glass, etc.,) or of irritating liquids (croton oil, tincture of iodine, etc.)

(2) The injection of sterilized blood into the vitreous.

(3) Intraocular injections of solutions of various antiseptic substances.

His own research, belonging to the third class of the division, was undertaken to determine on the one hand whether the injection of antiseptic fluids directly into the normal vitreous of rabbits would produce permanent lesions or not; and on the other, to test the therapeutic value of these injections in ameliorating or preventing suppurative ophthalmitis. The experiments comprised:

(1) The injection, into the vitreous chamber of rabbits, of solutions of various antiseptic substances, namely, bichloride of mercury, $\frac{1}{500}$, $\frac{1}{1000}$ and $\frac{1}{5000}$ respectively; cyanuret of mercury, $\frac{1}{1000}$; aqua chlorinata, officinal strength: pyoktanin, $\frac{1}{1000}$: trichloride of iodine, $\frac{1}{1000}$.

(2) The injection into the vitreous chamber (dog and ribbits) of an emulsion of staphylococcus pyogenes aureus of the sixth generation, and the production of a purulent hyalitis, followed by the injection of antiseptic fluids (bichloride of mercury and aqua chlorinata.)

(3) The simultanous injection of the staphylococcus emulsion and the antiseptic fluids.

There were six experiments with bichloride of mercury, the quantity injected varying from two to five minims. in each instance causing a permanent lesion either in the vitreous or retina, usually in both.

There were eight experiments with aqua chlorinata, the quantity injected varying from five to ten minims, in each instance, save one, causing permanent lesions in the vitreous.

There were five experiments with cyanuret of mercury, in each instance causing positive lesions.

There was one experiment each with trichloride of iodine and blue pyoktanin, resulting in the first instance in a very dense permanent lesion, and in the second in a faint opacity of the vitreous.

In the second series, the rabbits, in which purulent hyalitis had been produced by the injection of staphylococcus emulsion, failed to show any signs of amelioration by subsequent treatment with intraocular injections of strong solutions of bichloride of mercury, or of aqua chlorinata. In one experiment with a dog, favorable results were obtained by this method of treatment.

In the third series of experiments the simultaneous injection of bichloride of mercury, cyanuret of mercury and aqua chlorinata with the staphylococcus emulsion, failed to check the development of a purulent inflammation.

Microscopic examination of a number of the eyes on which these experiments had been performed showed lesions varying according to the length of time which had expired after the introduction of the drug. In general, they consisted of detachment of the retina; edema and sometimes detachment of the choroid; incarceration of the choroid in the wound of entrance; a form of retinitis analogous to that which has been described as retinitis proliferans; and the formation of a tissue in the vitreous resembling young connective tissue.

So far as these experiments are concerned, they are in direct opposition to the therapeutic value of intraocular injections of antiseptic fluids; but it was pointed out that, with a single exception, rabbits were employed, and that before full weight should be given to the experimental evidence thus far adduced, a similar series of experiments should be made in the eyes of dogs, especially as in one case, that of the mongrel cur, the intraocular injection was followed by the amelioration and probable cure of a violent suppurative ophthalmitis.

ABSTRACT OF A PAPER ON

# THE BEST FORM OF CYLINDER TEST AND VARIABLE PRISM, WITH A NEW PHOROMETER.

By EDWARD JACKSON, M.D.,
Philadelphia, Pa.

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Dr. Edward Jackson demonstrated that the best form of the maddox rod or cylinder test was one in which the cylinder should have a focal distance equal to the distance that the test is placed in front of the nodal point of the eye As ordinarily used, this would be 15 or 20 mm. Also that, since rays of light could only emerge from about 81° of the circumference of the rod, a thin slice off of one side of the rod was all that was of value.

With reference to variable rotary prisms he pointed out that, heretofore, these have always been so arranged as to use the prismatic effect which increases with the sine of the angle through which the prism is turned, rapidly at first when the prismatic effect is weak, more slowly later when the effect is stronger. This is the reverse of what would be most convenient. To improve this, it is only necessary to employ the prismatic effect which diminishes with the cosine of the angle through which the prism is rotated, diminishing slower at first, when the effect is weaker, more rapidly as the effect grows stronger. To do this, a fixed prism must be employed, so placed that its effect will be just neutralized by the rotary prism or prisms in the primary position.

Where the variable prism is to be employed with the Maddox rod, it is unnecessary to have more than one rotary prism; the effect at right angles to the direction used merely changing in the position of the line of light a little in the direction of its length. He had therefore, arranged a combination of the cylinder test and rotary prism, in which the single rotary prism had a strength of 5 centrads. Its primary position is such as to act in the direction of the rod: but in this direction its effect is neutralized by grinding upon the rod, or cylinder a prism of equal strength. As the rotary prism is turned from its primary position, the prismatic effect of the rod comes more and more into play, increasing, at first very slowly, then more rapidly. Thus the rotary prism is required to be turned 18° before ¼ centrad of effect is produced, and 37° before a whole centrad of effect is produced. When it reaches 90°, the whole effect of the prism ground on the rod is obtained; and turning still farther the effect of the rotary prism is added to this until at 180°, the total effect of 10 centrads is secured. This combination makes decidedly the most delicate phorometer yet devised, as well as one of great simplicity and practical value.

The diminution in the strength of the cylinder or rod also permits of its use with a black dot on white paper, at the ordinary distance of near work, giving an additional application for the rod test, and a new test for the muscular balance at the near or working distance.

[*These proceedings will be continued in next issue.—Editor.*]

# THE OPHTHALMIC RECORD,

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## IMPORTANT.

Did you see the little pink notice enclosed in your copy of the last issue of this journal? If not you will find another one in your copy of No. 4.

## DR. LUCIEN HOWE

Was married on the 16th inst. to Miss Elizabeth, daughter of Gen. Albion Howe, of Cambridge, Mass. The Doctor and his bride are now in Europe. We wish for them long life, prosperity, health and happiness.

## PROF. HELMHOLTZ

Is now in Chicago attending the World's Congress of Electricians. It would be a happy coincidence if he could finish his work in Chicago in time to meet with the Section of Ophthalmology of the Pan-American Medical Congress, in Washington. The Oculists of the Americas would be glad to look into his face, and express to him their gratitude for the wonderful little instrument, the ophthalmoscope, which his genius gave to the world. In the next issue we expect to be able to make a more extended notice of this great man, and the greatness of his achievements.

## CUTS TO ILLUSTRATE PAPERS.

As before announced, we will furnish these free of cost to the contributor so far as the photo-engraving is concerned. The contributor will be expected to furnish an accurate pen and-ink drawing (black ink must be used) which should be two to four times the size of the cut desired. This is necessary in order that no complaints may attach to the illustration. If the contributor is satisfied with the drawing he sends, he will be doubly pleased with the cut, for in reducing the drawing many of its defects are made to disappear.

## THE OPHTHALMOMETER.

This instrument has been both inordinately praised and unjustly abused. It is claimed by some that, having bought the instrument and finding it not coming up to their expectations, they "consigned it to the attic with other rubbish." If you have in your attic an "old model" or a "new model" Javal Ophthalmometer and you do not desire to "try it again," you of course would like to sell it at a reduced price. You can find a buyer by addressing "D", Washington, D. C., No. 1009 H St, Northwest. If what we have been hearing is true "D" will receive many offers. We shall see.

## NO SUBSCRIPTION AGENTS.

It is the policy of the editor of this Journal to keep in touch with the subscribers who are the readers. This alone would induce him to control, directly through the mail service, his subscription list. To save trouble to subscribers, personal checks have been from time to time suggested. It costs us nothing to collect them.

Our subscription list has steadily grown; and we have every reason for believing that it will continue to grow, without the medium of agencies. Our subscription price is too low to justify the payment of commissions to agents. Another reason for not employing agents is that we cannot know the personal character of men applying for an agency—they might be honest and they might not be.

This editorial is called forth by the fact, that in Jan. last, a man was in Milwaukee soliciting new subscriptions and renewals to the Ophthalmic Record. To convince Oculists that it was better for them to subscribe through him, he said they could do so at the reduced price of $1.50. How many he deceived in that city we do not know; but he *caught* some. Where he has been plying his nefarious business (always keeping the money, his chief concern) since then we do not know. We do know that he has no right to represent us, and that we never heard of him until last week.

Again let us declare that we have *no subscription agents in this or any other country*; and what is more, we do not propose to have. The existence of the *Record* is independent of soliciting agents.

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## "THE ESTEEM OF ONE'S FELLOWS."

In our exchanges we have noticed the following extract from a lecture recently delivered by Prof. Virchow:

"Who of us is not in need of friendly encouragement in the changing events of life? True happiness is not based on the appreciation of others, but on the consciousness of one's own honest labor. How otherwise should we hold our ground in the midst of the turmoil of the day? How should we preserve the hope of progress and of final victory against the attacks of opponents and the insults which are spared to no one who comes before the public? He, who during a long and busy life, is exposed to public opinion certainly learns to bear unjust criticism with equanimity; but this comes only through the confidence that our cause is the best, and that some day it must triumph. Such is our hope in our wrestlings for progress in science and art; such is our hope in our struggles for civil and religious liberty, and in this hope we gradually become hardened against malicious attack. It is a kind of immunization which, I acknowledge, has also great drawbacks; for this hardening toward unjust attacks leads very easily to a similar indifference toward just attacks, and, owing to the tendency to contradiction rooted in the nature of human thought, it finally leads also to indifference to praise and recognition. One withdraws again and again into one's self, discontented with the world and with one's self also; but who can so completely retire within himself that the consciousness of the insufficiency of human thought and that the criticisms of opponents are justified, cannot break through the crust of even the most hardened self-consciousness? Happy is he who has courage enough to keep up or regain his connections with other men, and to take part in the common work. Thrice happy he who does not lack in this work the flattering commendation of esteemed colleagues."

There is much to make us think in what the celebrated and *now-appreciated* Virchow has said above. If true happiness depended on the *manifest* appreciation of others, the earlier years of the lives of most men would be devoid of bliss. "Happiness, our being's end and aim," coming as it does from consciousness of honest thought and honest work, may fill the soul of him who, while living, may never know that he has the esteem of his fellows. And it is well that it is thus; else there would be less thinking and less working—the world would retrograde and not advance. In another sense it may be well that it is thus. Appreciation manifested inordinately for work well done, especially if it has been done by one young in years, might have the bad effect of preventing further development of thought to be made manifest in work—praise may paralize. But in most men usefulness can be increased, happiness can be augmented by consciousness of the esteem of his fellows added to the consciousness of honest thought and work faithfully performed.

The THINKER will continue think, in the face of severe, and often unjust, criticism of his thoughts; the WORKER will continue to work, knowing that, while a part of his works may be distroyed, a part will remain to augment the sum of human happiness and lessen the sum of human woe.

# Department of Otology, Laryngology and Rhinology.

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NASHVILLE, TENN.

## INTUBATION AND TRACHEOTOMY IN DIPHTHERITIC CROUP.*

BY WALTER B. JOHNSON, M.D.,
PATERSON, N. J.

The following indicates the special advantages of Intubation over Tracheotomy, the accidents, dangers, and prognosis of the cases in which intubation has been performed and the conclusions reached after a very considerable study of the literature of the subject.

The tabulated statement of the nineteen cases of croup requiring operation herewith presented shows, six recoveries, five after intubation, and one following tracheotomy which was performed in consequence of inability to determine the location of the tube, which had been swallowed. An attempt is made in the table to indicate the variety of the diphtheria, which very frequently determines the probable result, some of the cases indicating, by their violent character, an almost certain fatal termination; while others seem more favorable and the intubator feels, if the operation has been successfully performed, that there is a strong probability of a favorable termination. While intubation is preferred and always tried as a preliminary procedure it is believed that tracheotomy has its field of usefulness, and should be performed when necessary, and that no intubator should operate unless prepared, if the case demand it, to resort to an immediate tracheotomy. The instruments devised by Dr. Joseph O'Dwyer, of N. Y., are considered perfectly satisfactory. Dr Waxham, of Chicago, presented at the 44th annual meeting of the American Medical Association, a set of tubes and instruments for intubation, which were so arranged that the parts could be separated, and the instruments perfectly cleaned and rendered aseptic. The instruments which were manufactured by Chas. Truax, Greene & Co., possess this advantage and are in other respects similar to and quite as useful as any others.

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* The table of cases nineteen in number was presented at the 44th annual meeting of the American Medical Association at Milwaukee. The introduction was arranged for the *Ophthalmic Record*.

### THE ADVANTAGES OF INTUBATION OVER TRACHEOTOMY.

1. No anæsthetic is required.
2. The operation should be easily performed, after a careful study of the literature, and frequent trial on the cadaver, by any practicing physician or surgeon.
3. There is comparatively little danger and no shock.
4. The advantage to the practitioner of being able to perform the operation alone, without trained assistants.
5. The patients are more readily induced to permit an operation which requires no cutting and is not attended by bleeding.
6. The percentage of recoveries is greater, especially in cases under three years of age.
7. There is no wound that may permit absorption and be a source of constitutional infection.
8. It is susceptible of use in mild cases of croup, which seem likely to continue as such, in which tracheotomy would be too severe a remedy.
9. Parents are gratified for the relief of the dyspnœa, as the result of so moderate a procedure, even if the patient die.
10. Intubation can be better used when accommodations are poor and attention indifferent, as the tube requires comparatively little care.

The cases here reported, nineteen in number, are tabulated for ready reference, there were six recoveries in all, one of which resulted from an operation for Tracheotomy, which was performed after Intubation had failed. The Tracheotomy was considered necessary in consequence of a feeling of uncertainty regarding the whereabouts of the tube.

| Date | No. | In the Practice of | Sex | Age | Duration of Laryngeal Symptoms | Duration of Diphtheria | Cause of Death | Complications | Result | Size of Tube | Faucial Diphtheria |
|---|---|---|---|---|---|---|---|---|---|---|---|
| June '91 | 1 | Dr. D. T. Bowden | Male | 3 yrs 10 mo | 24 hours | 5 days | Extension to Bronchi | ... | Died 44 hours after Itubation | 3 to 4 | Present |
| June '91 | 2 | " B. C. Magennis | Female | 2 yrs 11 mo | 30 hours | 5 days | " " " | Loose Membrane | Died 3 dys & 6 hrs after Intubation | 2 | Well marked |
| Aug. '91 | 3 | " P. A. Harris | Male | 3 yrs | 24 hours | 4 days | Sepsis | Pulmonary | Died 36 hours after Intubation 14 hours after coughed out tube | 3 to 4 | Present |
| Sept. '91 | 4 | " W. S. Hurd | Female | 11 mo | 24 hours | 1 week | Asphyxia | ... | Died immediately from membrane pushed down before tube | 1 | Present |
| Oct. '91 | 5 | " C. Terriberry | Male | 4 yrs 6 mo | 5 days | 5 days | ... | Loose Membrane | Recovered, tube retained 24 hours | 3 to 4 | Present later |
| June '92 | 6 | " G. W. Terriberry | Female | 3 yrs 6 mo | 30 hours | 1 week | Cardiac Paralysis | Exhaustion | Died 5 days after Intubation | 2 | Pres. after clearing |
| Sept. '92 | 7 | " Colfax | Female | 4 yrs | 4 days | 4 days | " " | ... | Died 15 hours after Intubation | 3 to 4 | Present |
| Sept. '92 | 8 | " J. M. Stewart | Male | 4 yrs 6 mo | 4 days | 4 days | ... | ... | Recovered, Tube introduced 3 times retained 10 days | 3 to 4 | Slight membrane |
| Oct. '92 | 9 | " J. H. Banta | Female | 8 yrs | 24 hours | 4 days | Sepsis | ... | Died 2½ days after Intubation | 5 to 7 | Pres. & marked |
| Oct. '92 | 10 | " R Neer | Female | 9 yrs | 4 days | 4 days | Pneumonia | ... | Died 4 days after Intubation | 5 to 7 | No deposit till later |
| Dec. '92 | 11 | " Fliteroft | Female | 8 yrs | 2 days | 3 days | Exhaustion | ... | Died 6 hours after Intubation | 5 to 7 | Marked |
| Jan. '93 | 12 | " P. A. Harris | Male | 4 yrs 6 mo | 2 days | 2 days | Dyspnoea | Loose Membrans | Died 12 hours after effort at Intubation | 3 to 4 | Very extensive |
| Jan. '93 | 13 | " Wm. Blundell | Male | 3 yrs 4 mo | 2 days | 1 week | .. | .. | Recovered, Intubation failed, operation Tracheotomy, tube 19 days | 2 | Not pres. till later |
| Feb. '93 | 14 | " J. H. Banta | Female | 6 yrs | 48 hours | 3 days | Pneumonia | Extension to Bronchi | Died, tube retained 6 hours | 5 to 7 | No mem. pres. |
| Mch. '93 | 15 | " D. F. Bowden | Male | 4 yrs 6 mo | 5 days | 2 days | Sepsis | . . | Died 24 hours after Intubation | 3 to 4 | Thick black mem. |
| Mch. '93 | 16 | " Geo. Fischer | Female | 3 yrs 6 mo | 24 hours | 48 hours |  | . . | Recovered, tube removed on the 6th day | 2 | Considerable mem |
| Apr. '93 | 17 | " J. M. Stewart | Male | 2 yrs 7 mo | 18 hours | 5 days | ... | ... | Recovered, coughed out tube on 4th day | 2 | Present |
| Apr. '93 | 18 | " Geo. Fischer | Male | 6 yrs 7 mo | 1 week | 1 week | ... | .. | Recovered, coughed out tube on 6th day | 3 to 4 | Not pres. till later |
| May '93 | 19 | " Thos. Paton | Female | 3 yrs 10 mo | 1 week | 1 week | Exhaustion | ... | Died 2 days after Intubation | 3 to 4 | No membrane |

11. The ability to speak and breathe quietly, and the comfortable tolerance of the tube.

12. The contact of the tube causes some disintegration of the false membrane, hastening its disappearance and preventing its re-formation; the pressure also has a decided tendency to diminish œdema.

13. The tube allows the mucus and detritus to be freely expectorated, and the ability to close the glottis is retained, thus preserving the explosive quality of the cough, which renders the tube less apt to fill with membrane, or, if it should fill, assists in its almost certain expulsion

14. The inspired air is always warm and moist from its passage through the natural channels.

15. Deep ulceration is not apt to occur, and the superficial ulceration is not of serious moment.

16. Does not preclude subsequent tracheotomy.

17. May be used to replace a tracheotomy canula in case of obstructing granulations or tissue in the larynx.

### ACCIDENTS WHICH MAY OCCUR AFTER OR DURING INTUBATION.

Accidents of more or less moment occur with nearly every operation: they may be tabulated as avoidable and unavoidable; the avoidable accidents may be overcome by a thorough knowledge of the technique of the operation.

*Avoidable Accidents.*—

1. *False passage made in attempts at introduction:* use no force and hold the instruments lightly.

2. *Injuries to the parts in efforts at removal;* careful, steady operating will not result in material injury.

3. *Passing the tube into the œsophagus:* may happen, but it can be easily removed by the string.

4. *Asphyxia from slow accumulations of secretions in the tube;*

use the steam atomizer constantly, and remove the tube if necessary.

5. *Asphyxia from prolonged efforts at introduction;* make several efforts of short duration rather than one continuous and exhausting one.

6. *Asphyxia from swelling of membrane over the tube's head, fixing it, and feeling as though the tube had passed into the trachea;* remove tube and introduce one with larger head.

7. *Slipping of tube into trachea;* will not occur and is not possible when a proper sized tube is used carefully. The subglottic construction of the larynx prevents the tube from passing below the ventricular bands, unless the circoid cartilage is split.

8. *Spasm of the glottis immediately following removal of the tube as a result of irritation of inspired air;* may be prevented by the administration of an opiate shortly before removal.

9. *Catching the thread in the eyelet hole of the tube*, may be prevented by using braided linen or silk thread well waxed.

10. *Cutting the parts in the removal of the string*, may be prevented by cutting the string as close as possible to the tube and withdrawing slowly.

11. *Lacerations made by the gag or finger during the operation*, will be immaterial if the patient is carefully handled.

*Unavoidable Accidents.*—

1. *The presence of partly adherent membrane.* The removal of such membrane is a difficult problem to solve, many forceps have been devised for this purpose. Dr. O'Dwyer has introduced the set of foreign body tubes to be used in such cases; the solution which is still in doubt, consists in the means of detaching the membrane that it may be expelled or removed.

2. *Pushing down pseudo membrane before the tube.* The membrane will be less apt to be pushed down in front of the tube, if it is placed well in position before removal of the obturator, and held in position during its removal, as the tube if

drawn partially out may with its edge detach membrane, in being pushed back into the larynx.

3. *Fatal obstruction from membrane in or below the tube.* The tube is generally coughed up if obstructed: it must, however, be removed in some manner, or death will ensue. Always, if practical, leave the string attached in cases of this character. It is well to undertake to rid the patient of the membrane, either by introducing and withdrawing the tube, using a larger tube, or resorting to the foreign body tubes. If the patient is young there is danger of pulling at the string or of chewing it apart, the latter may be overcome if there is room, by passing the thread between the two double teeth. It may be necessary to use a small tube in order that it may be readily expelled by coughing in case of obstruction.

4. *Partial obstruction from aspiration of food or vomited matter into the bronchi.* It is very rare, if it occur at all.

5. *Coughing out the tube and swallowing it:* has occurred, and the absence of the tube was not discovered until too late or until harmful efforts at its removal with the extractor have been made.

6. *Coughing out the tube or expulsion during vomiting.* This accident is not serious unless paralysis is present. The dyspnœa does not often return until the operator, who should be immediately summoned, has had time to return and re-introduce the tube, which should be one with a greater retaining swell than the tube expelled.

## THE DANGERS ATTENDING INTUBATION.

In any operation there are dangers of greater or less moment to encounter. These dangers may or may not be susceptible of prevention. The dangers attending intubation over which the operator has no absolute control, are—

1. *The unavoidable accidents.*

2. *Shock of the operation*, which is very slight if it is rapidly and skilfully performed.

3. *Septic air passing into the lungs on inspiration.*

4. *Food and liquids entering the bronchi.* Of this danger Dr. W. P. Northrup, pathologist to the New York Foundling Asylum reports in substance as follows: "There has been no evidence of the presence of food in the finer bronchi or alveoli found in the one hundred and seven autopsies held at the asylum, and no pneumonia was present which could be fairly called *Schluck pneumonia*, aspiration, or food pneumonia, or nothing was found corresponding to the recent description reported by Orth, of Gottingen. Pneumonia was present, however, to some extent as demonstrated by obvious signs of consolidation, or the microscopic findings in about seventy-five per cent. of all the autopsies."

5. *Ulceration from pressure of the tube on the trachea* is not frequently deep enough to be of moment, but in patients who have previously suffered from exhausting disease, ulceration may occur and easily amount to a complication, even when the tube is only worn the usual number of days.

6. *Œdema from pulmonary or glottic infection*, may result from the severity of the disease, or from local application of medicants applied on the tube: the tube itself diminishes the œdema by pressure on the parts.

7. *Hemorrhage from rupture of tracheal blood vessel.*

8. *Paralysis, septic, of the muscles of deglutition*: necessitating feeding by the stomach tube or per rectum.

## RESORTS FOR OPERATING FOR TRACHEOTOMY.

The following reasons for operating for tracheotomy after intubation has failed, were tabulated by I. H. Hance, M.D., New York:

1. "Intolerance of the larynx for retention of the tube.
2. Inability to administer a proper amount of nourishment.

3. Dislodgment of membrane during the operation.

4. Frequent plugging of the tube with thick mucus and shreds of membrane.

5. Passing the tube below cords with inability to extract.

6. False passage in which event tracheotomy must be performed immediately."

Loss of the tube by swallowing or otherwise when its location can not be determined and annoying dyspnea is present also indicate an operation for tracheotomy.

### PROGNOSIS.

The prognosis without operation in diphtheritic or fibrinous croup is very unfavorable; the disease results in about ninety-five per cent. of deaths. The latest statistics collected and the compilation of cases intubated indicate from sixty to seventy per cent. of deaths, or from twenty-seven to thirty-three per cent. of recoveries; the percentage of the recoveries is increased as the technique of the operation is more generally understood.

Important factors in the prognosis are—

1. The age of the patient
2. Time of origin of the disease.
3. Nature and extent of the membrane, the prognosis being better when the membrane is not present in the pharynx, having been present and disappeared.
4. The presence of complications.
5. The severity and height of the epidemic; during a fatal epidemic of diphtheria, and at the heighth of the epidemic, the cases are proportionately more fatal from septic systemic infection, also from complicating nephritis or pneumonia, and from a greater tendency to invade the bronchial tubes.

The prognosis is worse under the following conditions:

1. When the patient is young.
2. When no membrane has yet invaded the fauces or has only recently appeared or when the membrane is of the thick odorous black variety.

3. When the septic poisoning is very well marked.

4. When complicating conditions are present, fibrinous bronchitis, extending from the seat of the disease; nephritis, which is likely if present to be in proportion to the severity of the disease, with scanty secretion of urine containing large quantities of albumen and blood; pneumonia which may develop at any time, but generally comes on in the later stages.

5. When there is loss of appetite and disgust of food, complicating conditions are almost always present.

6. When high temperature comes on the second or third day after intubation.

7. When an increase in the respirations occurs, they may run up from forty to one hundred per minute, according to the age of the patient: such an increase would indicate diminution in the calibre of the tube or the presence of pneumonia.

8. When the disease comes on very rapidly and violently with excessive membranous deposits of dark color and foul odor with great tumefaction of the cervical glands and softening of the tissues in the pharynx and larynx.

9. When the stenosis comes on rapidly and the laryngeal symptoms have not been present for a considerable time before intubation was necessary.

10. When the epidemic is at its height the prognosis is more grave than it would be earlier, or later when the epidemic was on the decline.

11. When severe asphyxia, long continued before the operation could be performed, has been present producing a rarefaction of the air in the lungs with subsequent exhaustion, more or less atelectasis, collapse of the lung tissue, dilitation of the blood vessels, disturbance of the pulmonary circulation and resulting carbonic acid poisoning.

## CONCLUSIONS.

Intubation to be successfully performed depends upon—

1. The use of properly constructed instruments.
2. The skill and judgment of the operator.
3. The delicacy of the operation.
4. The thorough and complete knowledge of the requisite medical treatment.

5. The proper feeding and care.
6. The variety of the disease.
7. The severity and period of the epidemic.
8. The extent and number of the complications.
9. The careful examination of the patient at frequent intervals, and preparations to combat complications, or obstruction of the tube.

Intubation may be performed quickly under almost any circumstances in which tracheotomy is desirable, and also many times when tracheotomy is undesirable or impossible. The severity of the disease, the age and condition of the patient, the complications, the surroundings, the cause of the dyspnœa, no matter what the extent, do not militate against the operation. It may be performed early or late in the disease, and should be performed in all cases, even when apparently hopeless, to give comfort to the patient by preventing asphyxia, and give the possible chance of recovery.

The posture method of feeding suggested by Dr. W. E. Casselberry, of Chicago, has relieved the operation of one of the most objectionable features.

The pressure method of removal of the tube advised by Dr. Cheatham, of Louisville, has relieved the operation of its most difficult procedure.

The presence of the tube in the larynx must be demonstrated by the sense of touch before the extractor is used.

The tube must be removed at once if not expelled on the onset of sudden dyspnœa, and should be removed on trial if dyspnœa return after having been relieved.

The percentage of recoveries has increased as the operation grows older and the operators more skillful.

No evidence of the production of pneumonia by the aspiration of food has been noted in the autopsies made in this country by Dr. W. P. Northrup, of New York.

Tracheotomy should be performed when intubation fails. It is desirable for every intubator to have at hand the instrument for tracheotomy in case one of the unavoidable accidents should necessitate the operation.

THE
OPHTHALMIC RECORD.

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# THE SIMPLE DRESSING AFTER CATARACT EXTRACTION.

Written for the Ophthalmic Record by
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Within a few years past so much has been written and said about the after treatment of cataract, that I have refrained from renewing the discussion; but my recent observations of the methods of other operators and conversations with them on the subject, together with a special request from the Editor of the *Ophthalmic Record*, have prompted me once again to lay before my confreres the reasons for the faith that is in me.

While, one by one, eye surgeons are venturing to dispense with bandages after extraction, the great majority have not done so, and are exceedingly timorous of making the trial.

Those who favor bandages claim that they afford the eye greater protection, are very little trouble to apply and are equally as comfortable to the patient as would be a strip of plaster over the lids. The supposition is, that packing around and over the eye absorbent cotton or charpie and securing it by a somewhat resilient bandage preserves the normal shape or sphericity of the globe and prevents its movement.

A little reasoning ought, it seems, to convince any one of the fallacy of such reasoning. In the first place, the globe of the eye by reason of the tensile strength, inelasticity and resiliency of the outer covering, sclera and cornea, tends to preserve its proper curvature and shape unless divided to more than half its circumference. One can easily demonstrate the principle with a hollow rubber ball, by making a clean incision in it with a sharp knife. If the ball is not subjected to pressure the line of the incision is closed so effectually the place can hardly be found; but the slightest pressure on any portion of the ball will cause the incision to gape. So it is with the eye. Every one who has made many corneal sections has certainly been impressed with this fact. A nice clean section in the cornea, if no pressure on the globe by speculum or other instrument is permitted, will coapt so nicely that the place can scarcely be discovered; but the slightest touch on the globe will cause the wound to open.

The ideal condition for primary union in such a wound is to leave it in just the condition we see it when quiescent. How is this best accomplished? We know that the lids are perfectly adjusted to the front surface of the eyes, and are intended for their natural protectors.

When their free edges meet, the whole of the cornea and the sclera as far as the retrotarsal borders are ensheathed with a soft, smooth, evenly fitting cushion. Nothing more perfect can be devised The lids being flexible, any pressure without will be conveyed through them to the corresponding part of the globe. The ideal dressing, then, will be that which will not in the least interfere with the normal shape and position of the closed lids. Is it possible by packing cotton around the eye and over its front, held by a compress bandage, to add anything to the perfect coaptation of the lids to the front surface of the eye? On the contrary a perfectly uniform pressure is hardly possible. The dressing will be denser at one portion than another in spite of the greatest care; and the pressure will not be uniform, if there be pressure at all. In practice, two circumstances obviate what might otherwise prove a serious result of the use of bandages, viz., gaping of the corneal wound, and they are: first, the pressure is usually very light; and, second, the nice coaptation of the lids tends to hold the lips of the wound down and prevent their pouting or protrusion, and also to distribute the pressure if not too great, or uneven.

So that the chief credit must at last be given to the protection the lids afford.

We have further evidence of the perfect splint the normal lids are to the eye by the difficulty of getting a nice adjustment of the lips of a corneal wound, where the lids are much distorted as the result, for instance, of chronic granular conjunctivitis.

Again it is argued that a slight uniform pressure tends to prevent the muscular movements of the eye. There is doubt about the correctness of this. The only muscle so controlled is the orbicularis palpebrarum, and the slightest touch will usually quiet it when in a state of spasm, and nothing is more certain than fixing the lids by a strip of adhesive plaster extending from one to the other. As to the extrinsic ocular muscles, all disposition to spasmodic movements disappear naturally on closure of the lids. A quiet movement of the eyes under the lids will often take place however, when one is conscious, whether closed voluntarily or mechanically, and of which he will take no cognizance unless his attention is closely directed to it. I have had persons on whom I had performed extraction, complain of a soreness of the globe on movement under the bandage, a complaint I rarely hear since dispensing with bandages. I attribute it to the uneven pressure of the bandage, likely the result—a most frequent circumstance—of slight displacement of the cotton batting by rubbing and boring the head in the pillow and dragging on the bandage. Restless persons often displace the dressing to some extent, however nicely put on.

There is no harm to a corneal wound by slight and even movements under perfectly adjusted lids; and sufficient pressure to control such movement would assuredly prove dangerous to a corneal section. In fact the eye is more apt to be quiet without pressure than with it, since any discomfort that might be caused by uneven pressure will most certainly give rise to involuntary and spasmodic movements. It is best, therefore, not to attempt to impede the movements of the eye by outward restraint, since observation has shown that no harm comes of it, if it occurs in a natural way; hence some operators now only dress the operated eye and let the other go free, not fearing the normal physiological movements it will impart to the fellow eye.

A prominent ophthalmologist and friend of mine, in Chicago, recently asked me what was to be gained by using adhesive strips over the lids, in the place of bandages. There are several advantages, and they are as follows:

First, the lids are used as the natural splint and protection to the wounded eye, and are merely secured in their most advantageous position without any risk of pressure on the globe.

Second, the eye has natural drainage, and there is no retention of secretions to become septic.

Third, the eye is always open to inspection and the slightest untoward event can generally be suspected by the appearance of the lids, and the character of the secretion, which readily flows out.

Fourth, atropia can be instilled into the eye daily, or several times daily when required; without removing the dressing, or in any way disturbing the eye.

These are all important matters and are decidedly in favor of the simple dressing. Whenever it is necessary to remove the dressing daily, for any purpose, as sometimes occurs, it is an easy matter to soak it off with the antiseptic wash, and put on a new strip when redressed. All readers of recent ophthalmic literature, doubtless are familar with what I term, the *simple dressing*, viz., placing over the closed lids, extending from one to the other, a narrow strip of adhesive plaster, just sufficient to insure them perfect quiet in this position.

Dr. Charles E Michel, to whom I owe my knowledge of this dressing, uses gold-beater's skin; others use isinglass plaster, which I also used for a long while; but for some time I have used Surgeon's white gelatole plaster, prepared by Johnson & Johnson. I prefer it because soft and pliant and very adhesive, while at the same time it is readily removed by thorough saturation with water.

I have used this dressing exclusively after all iridectomies and extractions for the last seven years. A bandage is rarely used in my ophthalmic practice, even following lid operations, which I prefer usually to leave open. My results have been all that could be expected, considering the nature of the case, complications, accidents during or after the operation, &c.; and I have thus far seen no cause for going back to bandages again. The most critical eye, with great loss of vitreous, normal or fluid, does not offer objection to the use of this dressing; on the contrary it seems better suited in these very cases, as I have often had occasion to verify.

In a subsequent paper, I will give my methods of dealing with my cataract patients during and after the operation.

### MANAGEMENT OF THE PATIENT.

To those who believe in the greater security bandages offer the eye after a corneal section it may seem paradoxical, when I say that, with the discarding of bandages, I at the same time began to allow my patients greater personal freedom after extraction. My first impressions in this direction were suggested by the difficulty I had, in demonstrating the operation for cataract, to the medical students in the medical department of the Arkansas Industrial University. Having no suitable hospital at that time, I was in the habit of taking the class to the residence or boarding house of the person to be operated, and had, by reason, to suffer many disadvantages and inconveniences. So when Dr. Michel informed me that he made his iridectomies office cases, I was prepared to venture on greater liberties.

I remembered also my first iridectomy on a half idiotic epileptic, who came along wandering from place to place, nearly blind from a central leucoma in each eye. I chloroformed him and made an upward iridectomy on each eye.

Following the orthodox methods, I had him carefully put to bed with bandaged eyes. But he could not be restrained, and the next morning I found him sitting up with eyes open and bandages off. I gave him a sound scolding, rebandaged his eyes, and put him to bed again. But it was to no purpose, for he soon had the bandages off and was wandering about the house, and on the fourth day he took his little bundle of clothing and departed. Some weeks later I met him wandering around with nice clear colobomata and very useful vision.

After making a number of iridectomies, both at the medical college and in my office, with no untoward results, I could not see why an extraction might not be made with like safety. I determined upon testing it. Soon an old colored man presented himself at the college, and I extracted a mature cataract from one eye, and sent him home in a rude wagon, a distance of a mile and a half. He recovered perfectly. Then another and another were operated on at the college, and allowed to go home in any manner they wished, the majority by walking. Being satisfied that the procedure was a safe one, I began to do nearly all the extractions in my private practice in my office, on account of the saving of time and the better facilities for operating in a suitably arranged office.

Others were now allowing their patients greater freedom. Dr. Chisolm was operating down stairs, and allowing his patients to rise from the operating table, and walk up a flight of stairs to the eye ward. He further enlarged upon their liberties by dressing only the operated eye. Dr. Cheatham, about this time, published an article in which he announced that he was in the habit of operating for cataract, at the medical college, before the students, and allowing his patients to be led home. He was using bandages, while Dr. Chisolm was using the strip of plaster.

While I may not be entitled to priority in converting extraction into an office or dispensary operation, I claim to have ventured upon my own judgment, and to have done a number of such before any one else reported having done the same.

Having first established fully in my mind, the perfect safety of using the lids as a splint to the eye, I used no other dressing no matter what accident may have occurred during the operation. Extensive loss of vitreous, normal or fluid, was no counter indication to either the adhesive strip as the only dressing, or even to performing the operation in office or dispensary and sending the patient home.

The position of the body has but little to do with the condition of the eye, unless, of course the head is dependent. Observation will soon teach one that the gush of vitreous, that some times occurs during an extraction, whether it is fluid or not, is due to compression of the globe, by contraction of the recti muscles.

Without compression even fluid vitreous will not run out of an eye with a good sized corneal section, in whatever position the eye may be placed.

I one time attempted an extraction on a hypermature cataract in a man eighty years old. The instant the capsulotome touched the lens, it disappeared in the vitreous chamber, and vitreous began to ooze out. I quieted the eye by removing the speculum and closing the lids a moment, and then proceeded to fish the lens out, in which I failed.

Fixing a head mirror on, I turned the patient on his stomach with his head projecting over the side of the operating chair, and face downward, and lay on my back upon the floor, with a beam of light thrown on the eye from the mirror. I was delighted to see the lens gravitate into the anterior chamber, and with a sharp hook, I easily captured it. No vitreous followed it, strange to say, notwithstanding the position of the head, and after a mild iritis, he made a good recovery with good vision, viz., about $\frac{20}{L}$. With a strip of isinglass plaster to hold the lids in position, he was allowed the use of the other eye, on which I had previously made a successful extraction, to see his way, and walked home alone, a distance of four squares.

In another instance the vitreous was fluid and half ran out, and the eye collapsed, and yet I only dressed the operated eye (the other was good) with a strip of plaster, and sent the patient home in a carriage, a mile or more from my office. This eye healed without a complication. Numerous other instances might be given to show that the fact of an eye being unsound is no special contraindication to the operation being performed in ones office, and the patient sent home, if not too great a distance, that is, within reach of the surgeon, that he may visit the patient daily. My patients are not required to lie down after they reach home; they may do as they like, lie down or sit up, only they are enjoined to keep quiet; and if they can see out of the other eye, not to use it more than is necessary, but not to attempt to read or even look about very much. These rules I have almost invariably found implicity obeyed. Occasionally an unruly patient will violate every injunction, and then he alone is responsible for the consequence. I have on two or three occasions after extraction, having left the other, in these instances a seeing, eye open, found the patient on my first visit to his residence on the following day, busily engaged in his or her usual avocations.

I did a simple extraction on a negro man last winter before the medical class, and he walked home a mile and a half, seeing his way with the other eye on which I had previously done the combined operation with good results. He never took to his bed, but living in a room to himself and having no one to wait on him, he made his own fires and fed himself. Result, a round central pupil, excellent vision, no mishap. I don't believe keeping the patient in bed is any guarantee against prolapse of the iris in simple extraction.

There are two cases on which I operated, that I would be glad to know the results. One, a negro man, took his little baggage, and boarded the train for home some twenty miles away, on the second morning after the extraction. I have never heard from him since. Another, a white man, a farmer, the next morning, eighteen hours after the extraction, mounted his horse and rode seventy-five miles to his home, being three days and nights on the way. He lost but little time after reaching home, but engaged at once in heavy work, such as chopping and rolling logs. From an account I got of him, I infer he did not have smooth healing and likely lost the eye.

Such extremes of course are folly; but there are certain restrictions that have been hitherto, and are still by many surgeons, put upon those who have submitted to an extraction, that are burdensome, and altogether unnecessary. I would briefly capitulate my views and methods, based upon seven years experience with them to the exclusion of all former methods:

1. The lids are the natural splint to the eye, and no other

dressing can avail anything beyond that necessary to maintain them in easy juxtaposition.

2. This is best done by a strip of isinglass, or gelatole plaster or gold-beater's skin extending from the outer surface of one lid to the other.

3. The dressing should not be disturbed without cause until healing is perfect.

4. It is unnecessary to close the unoperated eye.

5. It is safe to perform extraction in the surgeon's office, and send the patient home within visiting distance of the operator.

6. It is not necessary to confine the patient to bed.

7. It is unnecessaay to darken the room beyond excluding any disagreeable light.

8. Fluid vitreous, dislocation of the lens and simple extraction are no contraindications to the foregoing rules.

## The Scientific Proceedings of the Section of Ophthalmology of the American Medical Association, at the Milwaukee Meeting, June, 1893.

*Continued from page 106, current volume.*

ABSTRACT OF A PAPER ON

# TWO CASES OF BRAIN TUMOR, WHERE OPTIC NEURITIS WAS THE ONLY POSITIVE SIGN.—AUTOPSIES.

By E. P. MORROW, M.D., Canton, Ohio.

Although pathognomonic symptom is a term in medicine, yet, taken in its strict interpretation, we have no symptom by which we can positively determine a disease without question. Taken in its better sense, a characteristic symptom of a disease, we may call optic neuritis a pathognomonic symptom of brain tumor. This has been so well established that it needs no discussion. The object of this report is not to further establish that fact, but to present two cases in which optic neuritis was the first, and up to the time of its discovery, the only positive sign upon which a diagnosis could be based. For that reason, I take it, brain tumor, with its ophthalmic aspects, may be worthy of a discussion here, in-as-much as the ophthalmologist is sometimes called upon to give his opinion and to aid in the diagnosis of a case.

To give positive or negative evidence as to choked disc may be all that is asked of him, but if he is also able by his knowledge of the relation between choked disc and intercranial diseases to differentiate between abscess, tumor, aneurismal tumor, etc., as well as to give some opinion as to its probable location within the skull, his services will surely be of more value than those of the specialist whose knowledge, as well as his practice, is limited to the eye.

Autopsy.—Body fairly well nourished. Calvarium well removed, external and internal surface of skull normal. Calvarium not unusually adherent to dura mater. Dura mater hyperemic. Surface of brain, when dura was removed, showed no abnormality or dissymmetry. No unusal amount of fluid in arachnoidal space. Brain removed without membranes. The optic nerves were exposed, showing to sight and touch no unusual appearance. Longitudinal sections of the brain were made from above donwards. The tissues were normal in appearance and consistency until the temporal lobe of right side was reached; here the tissues began to soften from above downward until a glioma, pear-shaped, amber in color, soft and somewhat commingled with the cerebral substance was found, lying at the base of the middle lobe. Its long axis, more than two inches, was directed backward and inward. The large end, over an inch in diameter, was backwards and within the temporo-sphenoidal lobe; the small end forward and outward.

Autopsy.—Body greatly emaciated. Calvarium removed. Membranes anemic. Membranes opened. No arachnoidal fluid. Brain removed without membranes. Surface of brain showed no dissymmetry, but bloodless. Sections of brain made horizontally from above downward; nothing abnornal except anemic condition until ventricals were opened. These were enormously enlarged and distended with fluid. Further sections of the cerebrum showed no evidence of lesion. When the cerebellum was examined a tumor, disc shaped, about one half inch in thickness and two inches in diameter, was observed upon the superior surface of the cerebellum, covering the superior vermiform process and extending about equally over each lateral hemisphere. The tumor was a soft glioma and broke down under slight pressure. An examination of the optic nerves showed nothing abnormal to sight or touch.

A point of interest in the autopsy is the absence of fluid in the arachnoidal space in both cases, as well as the apparent normal state of the optic nerves to the unaided senses. No microscopic examination of the nerves was made to determine the condition of the sheath or intervaginal space.

Of the two prominent theories advanced for choked disc, viz., the lymph space, and the vaso-motor paralysis theory, I cannot see that these cases add to or subtract from either. Certain it is that out knowledge of the pathology of optic neuritis is unsatisfactory and that neither of the theories, clever and enticing as they are, are able to withstand criticism or investigation. The conclusions reached by Gowers are rational and in accord with the present state of our knowledge. He says it is probable that optic neuritis is rarely due to a single factor, and that the most potent element is the descent of a process of tissue irritation, which when it reaches the papilla sets up a more intense inflammation; that in some cases this influence is alone effective; that in others it is aided by the distension of the sheath which hinders the escape of effete products, increased edema, or even conveys irritating material.

The distinction between optic neuritis and choked disc is one of degree and not of mechanism. So far as optic neuritis has any single significance, it is that of irritative process within the skull.

## DISCUSSION.

Dr. deSchweinitz:

I have listened with interest to Dr. Morrow's paper, and would urge the importance of placing upon record, in connection with careful ocular examination, all cases of intracranial lesion, especially tumors, in which the position of the disease had been substantiated by an autopsy.

We all know that there are the so-called "quiet regions" in the brain. I had a case, in my own practice, of large tumor of the right frontal lobe, without the presence of active symptoms until about thirty hours before death. The tumor occupied the white matter of the right frontal lobe as far back as the bases of the first and second convolutions, and from the ventricular surface involved the head of the caudate nucleus, and, by softening, the structures as far back as the thalamus, and yet was practically, if not entirely, quiescent. Optic neuritis had been present for some time and was probably the only symptom of the brain tumor until thirty hours before death, when convulsions, hemiplegia and conjugate deviation of the head and eyes to the left side were noted. These symptoms were the result of a fresh hemorrhagic lesion in the left crus and on the left optic thalamus.

I would urge the importance of a careful examination of the field of vision in all cases, especially if operative interference upon the intracranial lesion is contemplated. I have the report of a case of epilepsy, not Jacksonian in type, which had existed for two years, with no other symptom save the convulsive attacks and headaches. The fields of vision were then concentrically contracted. Two years later double optic neuritis and left lateral hemianopsia were manifest. On the strength of the late development of the hemianopsia, Dr. Wood diagnosticated a secondary lesion in the cuneus, thinking it probable that the original lesion, a tumor, was connected with the cerebellum, because this was the "region of silence" nearest to the area which gave evidence of the disease by reason of the hemiopic defect in vision. The patient was trephined by the late Dr. Agnew, and a cystic tumor. or area of inflammatory degeneration, found within the cuneus beneath the grey matter. The patient died, and at the autopsy a large tumor, occupying the second and third temporal convolutions of the right side and approaching the fourth convolution, was discovered, together with a patch of hemorrhagic softening in the cuneus and a line of softening running nearly the whole length of the centre of the occipital lobe. The field of vision in this case correctly located a lesion in the cuneus, although it gave no evidence of the tumor in the temporal lobe on the right side, which hence may be involved without the production of immediate direct symptoms. This case, utilized to illustrate the importance of the field of vision in localizing intracranial lesions, has been fully reported, both from the neurological and the surgical aspect, by Drs. Wood and White.

Dr. Morrow closing:

In reply to Dr. deSchweinitz remarks regarding the field of vision I will say that it was impossible to get any satisfactory tests of the field. Such rough tests that were possible were of no value and so were not reported.

I believe it to be highly important to impress upon the general practitioner the necessity of early and frequent examinations in cases of suspected head trouble as well as in those cases where the diagnosis is clear, for the reason that positive evidence can often be obtained by the ophthalmoscope and perimeter, both as to condition and location, that would escape other means.

ABSTRACT OF A PAPER ON

# OPTIC NERVE TROUBLES ACCOMPANYING OR FOLLOWING FEVERS, ESPECILLY TYPHOID FEVER.

BY JOS. A. WHITE, M.D.,

RICHMOND, VA.

Text-books say very little or nothing about optic nerve troubles accompanying or following fevers. It is therefore a field for research that will repay the labor expended. Many eyes are lost from atrophy after febrile affections. Before preparing this paper I wrote a few lines of inquiry to about thirty ophthalmic surgeons scattered over the whole country, east of the Rocky Mountains, asking their experience, and enclosing an addressed envelope for reply. Twenty-one responded. Six (Drs. Knapp, Burnett, Noyes, H. W. Williams, Gradle and Savage) said they had had little or no experience in optic nerve troubles in cases of fever. One (Dr. Calhoun) stated he could not recall to mind cases of this nature, but felt sure his record book would show he had met with them. Another (Dr. Hotz) said that his record book would also show cases of neuritis and atrophy following typhoid fever. Dr. Risley also stated he had seen such cases. Dr. J. L. Thompson had made similar observations. Dr. Jackson had seen cases but believed that there was an error in diagnosis, and that the real trouble was cerebro-spinal meningitis or typhoid fever complicated with meningitis. Dr. Kipp had seen cases. Dr. Michel expressed an opinion similar to that of Dr. Jackson. Dr. Bull had noticed cases of this kind. Dr. Oliver had also seen cases. Dr. L. Connor had seen atrophy that was ascribed to typhoid fever. Dr. Eugene Smith had also seen such cases. Dr. de Schweinitz reported that he had seen optic nerve troubles in patients supposed to be suffering from typhoid fever., but in one case the autopsy revealed a tubercular meningitis. He had seen optic nerve troubles in malarial fever Dr. Keyser had seen very few cases of optic nerve trouble after typhoid fever. Dr. Alt had not seen real and lasting atrophy following fever alone. Dr. Theobald had not seen pure optic neuritis following typhoid or malarial fever. Dr. Würdermann had seen such cases. Altogether the report shows optic nerve troubles accompanying or following fevers more common than is generally supposed. I have seen three cases: First, a case of optic neuritis after typhoid fever that recovered. Second, a case of atrophy after typhoid fever that has steadily improved under treatment. Third, a case of complete blindness after malarial fever which recovered perfect vision.

In treating my cases of atrophy, I depend largely on the sulphate of strychnia and dil. phosphoric acid. Beginning with a small dose, a gradual increase is made day after day until, in some cases, one-fifth of a grain is taken three times a day.

## DISCUSSION.

Dr de Schweinitz:

When I wrote to Dr. White concerning my experience with optic nerve atrophy in fevers, I was under the impression that he wished data only in so far as typhoid fever was concerned. I was not aware that the Doctor intended to cover a more extensive ground; otherwise I might have added other cases to those which I had reported.

I endorse thoroughly Dr. White's use of strychnia in optic nerve atrophy, especially its use in full physiological doses, believing that by these alone good results are produced, while practically no effect is achieved by the ordinary doses which are administered.

In discussing blindness after fevers it was very essential to eliminate the possible influence of quinine, which I have no doubt Dr. White has done in his case, and which, indeed, was practically excluded by the exceeding smallness of the dose. Nevertheless, small doses of quinine in patients exhibiting idiosyncrasies are quite capable of producing blindness. I have seen temporary amaurosis follow the administration of fifteen grains of quinine in divided doses during twenty-four hours; and Dr. Horatio Wood, of Philadelphia, has reported a like result after the exhibition of twelve grains.

Dr. White closing:

Dr. de Schweinitz seems to think that there was a possibility of this case being blind from the use of quinine, a thing which I carefully considered before attributing the blindness to optic nerve trouble caused by the fever. I have never seen as little as two grains of quinine at a dose produce blindness. Two or three grains daily until she had taken ten grains would hardly have been sufficient to produce an effect like this. I have seen cases where blindness was apparently produced by malarial influence before any quinine was given. These cases usually recover.

### ABSTRACT OF A PAPER ON

# POSTERIOR SCLEROTOMY AS A PRELIMINARY TO SOME OPERATIONS FOR GLAUCOMA.

By H. GIFFORD, M.D.,

Omaha, Neb.

A simple iridectomy for glaucoma, where the tension is high, is often difficult and dangerous on account of the shallow anterior chamber, the tendency to loss of vitreous and the chance of the high pressure in the vitreous forcing the iris so firmly against the cornea that the anterior chamber may be very slow about refilling or may not refill at all; the eye remaining hard and the operation proving useless or worse. The chance of avoiding these complications is much greater if, immediately before making the iridectomy incision, a sub-conjunctival incision (3–4 *mm.* long) through the sclera into the anterior part of the vitreous be made with a cataract knife. This lowers the tension in the vitreous so that the anterior chamber becomes deeper, allowing the iridectomy incision to be made more easily; the danger of loss of vitreous through the iridectomy wound is practically done away with; tension in the vitreous is so much reduced that the anterior chamber refills promptly and the iris is pushed back from the outlets at the filtration angle. The preliminary sclerotomy is also useful in cases when, with high tension, the globe has to be opened for other purposes than to perform an iridectomy; for instance in extracting dislocated lenses it greatly lesens the danger of loss of vitreous. In one case of luxation of a transparent lens into the anterior chamber with secondary glaucoma the lens was restored to place and all bad symptoms relieved by a posterior sclerotory. When the preliminary operation is made the iridectomy incision must be made with a sharp cataract knife, not with the spade knife.

ABSTRACT OF A PAPER ON

# COMMENTARIES ON DISEASES OF THE LACHRYMAL PASSAGES.

By H. GRADLE, M.D.,
Chicago, Ill.

The writer divides patients with lachrymal disease into two classes, according to the degree of lachrymation. In the one class the eye waters only when exposed to wind or dust or eyestrain—in other words when the tear gland is called into activity by any occasional stimulus. In the second class the weeping is continuous. There must be in these patients some morbid irritation which maintains the continuous weeping. This source of irritation is sometimes an intra-nasal anomaly, more often the disease of the tear passage itself.

The prognosis as to rapidity and permanency of cure is invariably better when the lachrymation is of the occasional than when it is of the continuous type. The difference in results in different patients is less due to the therapeutic method than to the nature of the disease.

The author recommends electrolysis of the duct in cases of stricture in which the probe can enter without undue force.

## DISCUSSION.

Dr. Bettman:

It seems to me that the division referred to by Dr. Gradle is a very wise one indeed. There is a great number of cases of epiphora where there is no stricture, but a hypersecretion of tears due simply to reflex action from membranes of the nose. In these cases I have been contented to wash out the lachrymal passages, and if I find water passes through nicely into the nose I am sure the duct is open.

To the remark made by Dr. Wood in reference to the introduction of probes by Becker I would say that Dr. Becker would not have been satisfied to use the probes 1 & 2 only, but he used 4, 5, 6 and 7. He passed them in rapid succession one after another, after having dilated the lachrymal duct with a No. 5 Bowman tapering to a fine point.

Dr. Gould :

I am sorry I arrived too late to hear Dr. Gradle's paper in full, but I wish to say a word in regard to the plan of treatment which I have found successful in these obstructions of the lachrymal duct. The patient being in a recumbent position, I flood the eye with a simple astringent and antiseptic solution. Then emptying the sac by pressure I again allow the solution to pass into the sac and duct, again pressing it out ; and so on for several minutes, twice or three times a day. I have been carrying on this plan of treatment during the last year and have only found two cases where it was not successful. It has certainly been most satisfactory so far as my own practice is concerned ; and I have received word from two or three others who have found it equally successful. I find it often impossible to tell at a glance just what sort of stricture we have ; and this at least is a ready means of differental diagnosis.

I believe it will effect a cure in all cases where the stenosis is functional, due to congestion, etc., but not of course when there is organic stricture.

I had a patient come to me after she had been treated unsuccessfully for a great number of years. It is true it took me two or three months to effect a cure, but being under this treatment for that length of time she is now a well woman.

ABSTRACT OF A PAPER ON

# PERSISTENT SPASM OF ACCOMMODATION TEMPORARILY RELIEVED BY TENOTOMY OF THE EXTERNAL RECTI.

ALBERT R. BAKER, M.D.,
CLEVELAND, OHIO.

I believe that nearly all the troubles we have with the muscles of the eye-ball are due to, and are the direct outgrowth of, the errors of refraction. This is generally recognized in cases of hypermetropia as a cause of strabismus.

In most cases of muscular asthenopia we have the same excessive nervous stimuli sent to one pair of muscles that we do in strabismus; and those patients who have not sacrificed binocular vision consequently suffer from pain and other nervous disturbances due to the conflicting efforts at accommodation, on the one hand, and those of convergence on the other. It has been my experience not infrequently in cases of errors of refraction, after correcting the ametropia, to find that, while I had relieved the pain due to the efforts at accommodation, I had disturbed the equalibrium that had become established between the efforts of accommodation and those necessary for binocular vision, and thus set up a train of symptoms almost if not quite as annoying as those from which the patient suffered before. And on the other hand after performing tenotomy of one or more of the recti muscles I have relieved these patients of one kind of distressing symptoms only to be followed by others fully as bad. So that I am skeptical as to the possibility of benefitting any case of asthenopia by a tenotomy in which prisms or the closing of one eye does not give at least partial relief. It has been my practice in these cases to first correct the error of refraction; if the asthenopia is not cured, then to resort to the use of prisms and the systematic exercise of the muscles. If the prisms or suppressing the image in one eye gives partial relief, I then propose a tenotomy with considerable assurance that it will afford permanent relief, doing permanently what the prisms do temporarily. But in all cases in which no perceptible improvement can be obtained by the use of prisms or muscular exercise, I give a very guarded prognosis as to the result of a tenotomy, because in my experience these cases have usually proved unsatisfactory, the disease as I believe, being the local expression of a general neurosis and often not amenable to ocular treatment.

### ABSTRACT OF A PAPER ON

## SOME PRACTICAL EXPERIENCES WITH MUSCULAR AMOMALIES,

By T. E. MURRELL, M.D.,
St. Louis, Mo.

The Maddox rod is the most reliable test for heterophoria we have. Prince's phorometer is a convenient and ingenious application of the rod test. The Grafe test is not reliable in small errors, especially for hyperphorias which are important to a half degree or less. No eye suffering from asthenopia is completely examined until the muscular balance is carefully tested. Heterophoria is closely related to errors of refraction and also to amblyopia of low degree.

A case is cited where an esophoria of 10° is relieved by correcting an astigmatism of 0.25 D. Lateral tendencies of 1° to 4° quite common and, unless asthenopia exists, should be considered physiological. An orthophoria or even an esophoria may be converted into exophoria by withdrawing the tension on the accommodation. A case is cited. The neurotic suffer most from heterophorias and are the most difficult to relieve. Variable eso- and exo-phorias are not always due to hyperphoria as claimed by Dr. Stevens. A case is cited of marked exophoria, being sometimes orthophoria, and even esophoria, with no hyperphoria. The vertical deviations are the most distressing and should be first corrected. A case cited with persistent diplopia in long standing high grade of esotropia, after correcting which there was no further confusion, although there was a hyperphoria of 6°, a prism to correct which added to comfort. Does not follow Prince's rule to correct half the hyperphoria, and one half to one fourth the eso- or exo-phoria, but corrects the whole hyperphoria, the greater portion of the exophoria and one half or less, of the esophoria Treatment by prisms or by decentering the lenses satisfactory only in small errors, and not always in them; in the greater errors they are unsatisfactory. Orthoptic training, sometimes good, is tedious and often disappointing. The method likely at fault. Altenate contraction and relaxation, as suggested by Savage, more in accord with physiology.

Cases that will not yield to orthoptic training should be submitted to surgery. A practical rule by Savage: "Whenever the red glass over one eye shows diplopia, or there is a hyperphoria of 3°, or an esophoria of 10° we should operate." Careful partial, or even total, tenotomies, gauging the extent by the result obtained, frequently testing as the operator proceeds, is the method preferred. Advancing may be called for. Some cases of heterophoria are very stubborn to correction, whether from "antipathy to single vision" or from heterophoria, according to Stevens, a question not altogether settled. A case cited calling for repeated operations, giving each time temporary relief, and in the end pretty nearly, but not quite, correcting all heterophoria, but still unsatisfactory as to the relief of a train of nervous phenomena unquestionably attributable to the heterophoria.

## DISCUSSION.

Dr. Savage :

I always like to give a reason for the faith that is within me, but not being able to do so in so short a time as five minutes, I must refer you to the last issue of my journal, to the two papers, one on "Rhythmic Exercise, the Proper Method of Developing the Ocular Muscles," and the other on "the Relationship between the Centers of Accommodation and Convergence." In one or the other of these papers you will find a reason for every statement I shall make. In the first place we have two forms of esophoria: true esophoria, dependent on the natural structure of the muscle or its attachment, and pseudo-esophoria, dependent on the relationship between the centers of accommodation and convergence. Likewise we have two forms of exophoria, a true and a psuedo. In reference to Dr. Baker's case I will say that spasm of accommodation, in the true sense, is always associated with, and dependent on, exophoria, and therefore can be cured by correcting the exophoric condition. If the patient is myopic a part of his exophoria—in some cases the whole of it—may be relieved by prescribing a full correction of the myopia; but if the patient is hypermetropic a full correction, or even a partial correction, of the focal error will make the patient worse by adding a pseudo-exophoria to his true exophoria. When the exophoria is as great as in Dr. Baker's case, a part of this condition must be relieved by operation. In operating on a case of this kind only the exophoria for distance should be corrected, leaving the remaining exophoria in the near to be corrected by rhythmic exercise. It is always well to divide the operative effect between the two corresponding muscles. It is my practice to operate on one muscle *one* time only; but I never divide a tendon completely in any form of heterophoria, always leaving a few fibres above and below to prevent the muscle's retracting too far.

Exophoria in emmetropic and in hypermetropic eyes grows worse with advancing years, while an esophoria in such eyes decreases as the patient grows older.

Dr. LeMond:

I have had some experience in the anomalies of refraction, in connection with asthenopia and a want of muscular equilibrium, and in trying to establish the same by tenotomies of the ocular muscles. And I have come to the same conclusion as the old negro who undertook to eat the largest potato in the country, who said: "The more I ate the larger the potato got." So it is with me in regard to muscular anomalies, combined with the errors of refraction: the more we cut then and the more attention we pay to the muscles alone, the greater the subject gets on our hands.

I think the digestive system often plays a very important part in these affections. In other parts of the body we might ascertain what cause existed that was assisting, in a reflex way, in augmenting the ocular anomalies. I think the more attention we pay to the whole body, but at the same time not neglecting the eye in our investigation, the more successful we will be. I think a great many of these troubles are augmented, very largely, in people suffering from nervous depression and poor digestion in connection with bad hygienic surroundings and the want of proper kind and amount of food.

In females, my experience teaches me that these troubles are often associated with uterine troubles of various kinds, which are always ready to act in conjunction with these complicated ocular troubles in pulling down the system; and so a *vade mecum* is formed. I have quit looking for emmetropic eyes, for I believe on a close and careful examination that we would not find one eye in one hundred to be in a state of absolute muscular equilibrium.

If decided squint is absent by no means tenotomize the muscles. Exercise them with prisms, in a gymnastic sense, say ten to twenty minutes once a day, but do not proscribe prisms for constant use. Correct the manifest hyperopia or myopia and the astigmatism which, I think, you will find in nineteen cases out of twenty. If the patient is under thirty years of age I give them seventy-five per cent of a full correction, with glasses, and I think I can safely say that nineteen cases out of twenty, which have come into my hands, have been relieved.

Dr. J. L. Thompson:

My experience is somewhat like that last given. We are indebted to Dr. Murrell for the interesting paper and classification. I believe there is a very large class of these patients who can be cured, or relieved almost entirely, by the correction of refraction. This will include 90% or more of the muscular conditions. A number of years ago when I first began practicing I corrected, as far as possible, the muscle errors by use of prisms and would get almost entire relief; and almost invariably on correcting the refractive error, the astigmatism particularly, would get entire relief. In correcting astigmatism alone I believe relief often comes to the patient There will be a small percent of these patients who will have to have the muscular anomalies corrected by operation, but the majority yield to correction of refractive errors. It is a bad thing to be picking at one muscle so many times. I have had patients who wore the prisms for some months and not a particle of insufficiency of the recti muscles existed after two years. I do not believe that a partial tenotomy ever benefited a case on this earth, but that all such reported cases would have done just as well without the operation.

[ The last wail of my friend Thompson indicates that he is passing through the throes of that agony that must precede the giving up of old and cherished views, in order to the acceptance of new but valuable doctrine.—Editor.]

Dr. Risley:

I wish to express my gratification over the conservative tone which has characterized the discussion of these papers. In the management of the anomalies of muscular balance it is possible that, in some instances, too great enthusiasm and inadequate study of the case in hand have led some operators beyond the bounds of prudence. Indeed I have already seen the consequences of mistakes in this direction. I have under observation a gentleman suffering from incipient tabes, with impaired reflexes, lightning pains etc., who had, nevertheless, had his external rectus cut for a supposed exophoria. I have another patient with impaired innervation of the interni from obscure nuclear disease, which had been overlooked and the externi cut by an enthusiastic surgeon, this too when a careful study of the strength of the muscles had shown but six degrees of abduction and to degrees of adduction. Fortunately no great harm could result under such conditions; but such instances demonstrate the necessity for great caution, lest the early symptoms of a nuclear palsy, or the incipient stage of tabes, which so frequently declares itself in transient ocular symptoms, should be mistaken for so-called heterophoria. When attention was first called to this subject in its most modern phase, I could but wonder how I had succeeded in relieving so many people of their asthenopia, being unmindful of the reputed frequency of these anomalies of the vertical muscles, and in a measure also of the external rectus. A more careful study of these persons who had not experienced entire relief from correcting glasses and careful attention to general health etc., soon convinced me that in a certain number of cases the trouble was due to some form of muscular anomaly. Within a few years I have succeeded, either by carefully adjusted prisms or by tenotomy, in greatly relieving a large number of my former patients and others. Therefore while mistakes may have occurred and inordinate claims for the efficacy of tenotomy in curing diseases of the general nervous system may have been made, still I am sure there is too much of truth in these claims, and too much of real value in the careful study and treatment of heterophoria to relegate the whole subject to the realm of the charlatan.

Dr. Baker closing:

I do not wish to convey the idea that there is nothing to be gained in these operations for hetorophoria: in fact I make them and possibly as often as any one here (but not as often as some of my neighbors whom a friend of mine calls "post-graduate fiends") and get good results in most cases. The point I wish to make is this: Which are the operative cases? Not such a case as this: A patient came to my office some time ago in which a so-called oculist had proposed an operation for heterophoria and yet the patient had one and one-half D. of hypermetropia which had not been corrected. I gave him a pair of spectacles; his muscular insufficiency disappeared together with all asthenopic symptoms.

The muscular insufficiency in this case was caused by the error of refraction, as I believe it to be in ninety-nine cases out of a hundred. In nineteen cases out of twenty, if we correct the refractive error we will give comfort to our patients. In all I prescribe lenses that fully correct the error of refraction and tell the patient to wear them a certain length of time and if the symptoms of asthenopia do not disappear I then correct with prisms, muscular exercise or by an operation.

Dr. Murrell closing:

I believe that this subject of muscle errors is very imperfectly understood by the majority of men in our profession. I confess I knew nothing of muscle errors until within the last year. I am just beginning to see light; that there is something in it there is no doubt. I take a very conservative view of this subject of operation. I have had patients bring their glasses back and object to taking them because they did not give entire satisfaction. Until I began to search for these muscle errors I could not find what the cause of complaint was. I have prescribed prisms in a number of cases lately giving complete relief in a large portion. When a patient comes to me I first correct the refractive error, and then correct the muscle error by prisms, and if this fails to give relief I perform a tenotomy.

Dr. Savage has devised means by which we can exercise the ocular muscles, and thereby develop them. The character of exercise set forth by him in a recent publication in rhythmic and must, in all cases, stop short of fatigue.

### ABSTRACT OF A PAPER ON

# SQUINT AND ITS TREATMENT,

By J. H. THOMPSON, M.D.,
Kansas City, Mo.

All will agree with me that the common operation for converging squint is by no means perfected. Of all operations on the eye, next to iridectomy for acute inflammatory glaucoma, I believe the operation for squint to be the most difficult. Yet every traveling quack and all the post-graduate enthusiasts will tenotomize a rectus muscle at any time, on any kind of a patient. In conversation with some members of the profession a few years ago, some of them stated that the correction of strabismus was "Child's-play," and almost beneath the dignity of and eye clinic. It is an easy enough matter to straighten the eye of a child with immediate bright result; but with a large majority of these cases the more satisfactory the operation primarily the more disastrous the remote consequences. I am inclined to believe that many people never acquire binocular vision, the visual apparatus being defective either in a want of commissual fibers between the two visual centers, or an abnormal relationship between these centers and the psychical areas in the cerebral cortex. Not many days ago I examined a man thirty years old who had alternating coverging strabismus. The vision in each eye tested separately was $\frac{20}{18}$. If looking to the left of the vertical plane, he would use the left eye and squint the right; if to the right of that plane, he would use the right eye and squint the left. No combination of prisms or colored glasses could excite diplopia. His refraction was hypermetropia 2½ D. In this case the patient suppressed the visual field in the eye not in use at the time. I have seen the same thing in young children in beginning squint.

It cannot be denied that some children are born with an ambliopic condition. It is also certain that the majority of children with beginning squint, if observed closely, will show an ambliopic condition which could not be the result of the disuse of the eye, because of its existing so early. So often have I observed this that I consider it to be a rule rather than an exception; and I believe that congenital amblyopia is the predisposing cause of the squint in these cases. Hyperopia is evidently the exciting cause; but we all know that many young hypermetropes can overcome a high degree of refractive error without fatigue of the ciliary muscle, and are seldom called upon to assist the accommodation by convergence. Hypermetropia combined with monocular amblyopia is hardly sufficient in itself to cause strabismus, because if we render the eye emmetropic with glasses, even at the time of periodic squint, there is no certainty that the deformity will disappear. Although some writers insist on such conservative treatment, the results are not satisfactory. It seems to me that often the external recti muscles are not capable of holding the optic axes parallel, since we know that the center of rotation lies outside of the vertical muscular plane, or of the plane of the superior and inferior recti muscles. So complicated in its nature is an internal squint that the operation for its correction is not so simple a procedure as many seem to believe. A most careful study should be made of every case.

It cannot be denied that the continued wearing of glasses may cure some cases; but, if I am not mistaken, the method is much less satisfactory than the surgical means at our command. It has this advantage: it can be tried at a time of life when all operative procedures are to be condemned. I am not in favor of prescribing glasses, however, for young children; and I always feel, when I see a baby in spectacles, that theory has run away with common sense. In squint dependent on simple hyperopia, when the vision of both eyes is good, binocular vision may be secured by a simple tenotomy and the wearing of correcting lenses, provided the patient is less than thirteen and more than eight. For reasons well understood, in making a simple tenotomy the operation should be divided between the two eyes and the cutting of the capsule should be in proportion to the degree of convergence. Stevens method of modified tenotomy has immensely simplified this operation and makes it possible to accurately gauge the effect.

Some of us are in favor of rotating the eye outward by means of a stitch, but some are afraid that this stitch has done more harm than good. Between the age of eight and thirteen years the stitch is certainly not necessary. In doing any operation for the cure of squint it is better to undercorrect than to overcorrect.

## DISCUSSION.

Dr. Savage:

In order to save time I will make a few statements, and for the reasons on which these statements are founded, I must again refer you to the last issue of my journal. One of two things must always be at the bottom of internal squint, viz., Intrinsic esophoria and pseudo-esophoria. In most cases the two coexist. Other conditions, such as a corneal scar or an amblyopia, are often associated with these causes. Hypermetropia, the cause of pseudo-esophoria, nearly always is found in cases of internal squint. True esophoria is rarely so great that the guiding sensation cannot restrain it, but when a pseudo-esophoria is grafted onto it, the two combined throw off the mastery of the guiding sensation and there results a *turning* where before there was only a *tendency*. The two forms of esophoria may be restrained by the guiding sensation for a long while (in most cases for a lifetime) when something disturbs the nerve centres and the esotropia occurs, the guiding sensation having lost its control. In all cases of internal squint the first thing to be thought of is the destruction of the pseudo-esophoria. This is readily effected by a mydriatic, the first effect of which, however, is to increase the squint by increasing the pseudo-esophoria. The pseudo-esophoria having been cured in this way, the true esophoria may be again brought under the control of the guiding sension, the eye swinging itself suddenly or by degrees into line. In very young children the mydriatic often is enough to effect the straightening of the eyes. In older children the hypermetropia should always be corrected to the fullest. The correcting lenses, unaided by the continued use of mydriatic, in some cases will cure the squint by removing the pseudo-esophoria; but in many cases the mydriatic must be made to aid the lenses because of a disposition, continued for a longer or shorter time, on the part of the eyes to cross when an attempt is made to fix on the near point. When squint is thus cured there always remains the true esophoria which, at some time, may have to be treated either by rhythmic exercise or by partial tenotomies.

But the great majority of these cases of internal squint are brought for treatment at a time when mydriatics and lenses cannot effect a cure. The balance must be done by tenotomies, complete when necessary, partial when possible. In all these cases the fully correcting convex lenses should first be determined, and an estimate made as to how much of the condition they will relieve. Then as little cutting of tendon and capsule should be done as possible.

Dr. J. L. Thompson:

I had a patient, quite a little child only three months old, who had strabismus in one eye only. By using the atropine I straightened her eyes. I have had patients where the eye turned in a good deal, in which I have used the mydriatic and glasses as early as the eighteenth month, who were very much benefited. In other patients I have operated on the muscle and have had success. In a certain number of cases we will never be successful by all the operative measures that have ever been devised. The only thing to do in these cases is to watch them. You will operate on a patient getting beautiful results and ten years later you will have something that does not suit you at all—the eye turns the other way. These patients we feel like sliding on some one more sanguine as to results. We had better never had anything to do with them. Concerning the question of ambliopia I will say that I am satisfied that in numerous cases there is more than heterophoria that causes strabismus.

[*The discussion of Strabismus will be continued in the next number.—Editor.*]

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See the pink slip in your copy of this issue of the *Record.*

## CATARACT.

After reading Dr. Murrell's valuable paper on "the simple dressing after cataract extraction," published in this issue, turn to Landolt's paper on "cataract operation in our time," published in double no. (4 and 5), vol. 2 of this *Journal*, and read it, if you have not already done so. Both of these papers will bear a second reading.

## OUR EUROPEAN GUESTS.

Dr. Wolf, of Glasgow, and Dr. H. Snellen, Jr., of Urtrecht, were present at every session of the Ophthalmic Section, P—A. M. Congress, and participated in the discussion. Dr. Wolfe is noted for his transplantations of skin without a pedicle. Dr. Snellen is the son of the man who gave to us our test letters. It was a pleasure to have those gentlemen with us.

## THE PAN-AMERICAN MEDICAL CONGRESS.

Was a success, viewing it from any and every standpoint. The attendance was large—about twelve hundred--and the scientific work done was of a high order of merit, as the volume to be published will show. The attendance from

Mexico was larger than from any other country south of us; but the medical fraternity of nearly all the goverments of the Americas was represented. A noticable feature of this meeting was the absence of many faces so familiar at the meetings of the American Medical Association.

The next meeting will be held in the city of Mexico three or four years hence.

## SECTION OF OPHTHALMOLOGY, PAN-AMERICAN MED. CONGRESS.

As was to be expected, Pres. Chisolm and Secretary Gould had worked up a good interest, before the meeting. The attendance was large and the work done was good from beginning to end. All papers were listened to attentively; and the discvssions were courteous though sometimes animated. Altogether much good—practical good—will result from this meeting.

As before announced, the second and third days were devoted to the study of "refractive errors" and "muscular errors" respectively. These papers, and the discussions elicited, are now being prepared for publication in this *Journal*, for the benefit of those readers of the *Record* who were not fortunate enough to be members of the Congress. These publications will go far towards enriching the current volume of the *Record.*

## NEW TRUTHS IN OPHTHALMOLOGY.

This little book, as announced on third page of cover, is now in the hands of the printer and will be ready for distribution by Nov. 1st, next. The author as a matter of preference is also the publisher. The price (one dollar) which he has placed on the book is so low that he cannot afford the usual trade discount, and for this reason it will not be handled through book houses; nor will it be put in the hands of agents One dollar sent direct to the author will secure the prompt sending of the little book —It is not the aim of the Editor of this *Journal,* who is also author of the volume. to praise this book to our subscribers or to prejudice them against it. Some of the facts pertaining to it are set forth on the advertising page already referred to. The author greatly appreciates the fact that many of the readers of the *Record* have already sent in their orders for the book. The author hopes it will be helpful to all who read it.

# Department of Otology, Laryngology and Rhinology.

Geo. H. Price, M. D., Editor, 621½ Church Street,
NASHVILLE, TENN.

## MACROSCOPICAL RESEARCHES ON THE ORGAN OF JACOBSON.

By M. RANGÉ,
Member of French Society of Otology and Laryngology.

Translated from the Revue de Lanyngologie d' Otologie, et de Rhinologie

By EDWARD C. ELLETT, M.D.,
Assistant Instructor in Microscopy, etc., in the Memphis
Hospital Medical College.

The fibro-cartilaginous diverticulum discovered by Jacobson on each side of the nasal septum excites but little interest at present, except among naturalists, and most human anatomists simply mention it. Very unequally developed in the animal series, and reduced, in the higher species, to a mere rudiment, like the pineal gland and vermiform appendix, it is no more in the human nose than a scarcely discerinble ancestral souvenir, whose very position is difficult to locate. Reduced, in the septum of man, to an almost imperceptible cul-de-sac, which many rhinologists have never seen, this organ, without apparent functions, has for us no other anotomical interest than the problem of camparative morphology which it presents. If, nevertheless, I speak to you of this rudimentary organ, it is because it is being much spoken of, and it has recently raised a number of questions which do not have to do solely with scientific anatomy but are of interest directly to the clinicians.

At the International Congress at Berlin, Messrs Loewe, Onodi, and Sandmann showed its probable rôle in the formation of certain abnormal thickenings of the septum and M. Potiquet (Soc. de Laryng. de Paris, Nov. 6th., 1881.) intimates, without however affirming it, that the depression which represents this rudimentary vestige in man, might very well be the point of departure of those perforating ulcers of the septum discribed in late years by Voltolini, (1888) Rossbach (1889) and Hapek (1891). On the whole, like many organs in the part of regressive disappearance, this apparatus seems to manifest its presence only by pathological processes; it recalls from this point of view, the cecal appendix, which serves little for any other purpose than to cause appendicitis; or the intermaxillary bone, which remains temporarily distinct in the human embyo without other apparent utility than to establish itself in a subsequent hare-lip, and all developmental deformities of which this region has the unfortunate privilege. This circumstance really gives, I think, to the organ of Jacobson, a fresh practical interest, which serves to draw the attention of clinicians to it. This is why I thought it worth while to show to you, by actual specimens, what this organ is in the animal species, where it attains its complete development, and to try to locate in man the undeveloped element which represents it. The organ of Jacobson, described for the first time in 1811 by the author who has given to it his name, shows itself in its most complete form in the ruminants and rodents, but it is undoubtedly in the cow and sheep that it can be most easily seen. It presents itself in the form of a cartilagious tube enclosing a cylindrical fibrous sac, and extending on each side of the nasal septum, to the surface of which it is closely applied. Immediately beneath the inferior border of the quadrilateral cartilage, from which they seem suspended, these two canals run paralel, in the antero-posterior direction, a little above the angle of junction of the septum and the floor of the nares, separated in the median line by the osseous vomer. The posterior extremity terminates in a cul-de-sac, whose wall shows no other opening than the small foramina by which the vessels and nerves enter the cavity of the tube. The anterior extremity of the canal, on the contrary, shows a gaping orifice, which opens principally below, but at a different situation in different animals. In the rodents it opens directly into the nasal fossa, while in ruminants it opens into the anterior palatine canal. To demonstrate these details I have made three series of preparations. I here show you, either the specimens themselves, where it has been possible to preserve them, or photographs of them. The first series consists of transverse sections, showing the canal at different antero-posterior levels; the second are whole preparations, showing the organ dissected after exposing it by a slightly lateral sagittal section; finally the other preparations, not of least importance, show the manner in which the canal of Jacobson opens in front into the anterior palatine canal. In the frontal sections, which are, as you see, the most elegant and the most easily understood, the two canals of Jacobson are cut perpendicularly to their axes. These sections show two cartilaginous rings, bearing superiorly, an accending process, which makes them resemble two racquets, of which the process is the handle. It is by these vertical handles that the canals seem to be suspended from the septal cartilage, which insinuates its thick inferior border between the two. The cartilaginous ring which surrounds the lumen of the canal and forms the frame of the racquet, is perfectly round at the level of the most anterior section. In proportion as the plane of section goes back, the canal flattens transversly, and takes an elliptical form with its long axis vertical. Such is the condition which I have found constant in the sheep, in preparing a large number of successive sections of the nasal fossæ from the incisor canal to the posterior cul-de-sac of the organ of Jacobson.

The arrangement differs slightly in the cow. Instead of descending vertically, as we have seen it do in the sheep, the part which I have just compared to the handle of a racquet, takes a very obligue direction, indeed almost horizontal, at the level of the anterior sections. The two cartilaginous circles are thus displaced outwards and more widely separated than in the sheep. Moreover the cartilaginous frame is incomplete, wanting below and out, and is here replaced by a fibrous wall, just as the fibrous portion of the eustachian tube completes the cartilaginous portion. In the cow, as in the sheep, the center of this cartilaginous ring, which represents the lumen of the tube, is filled by a soft reddish substance into which a probe penetrates easily, and which exudes, on pressure, a viscid material, and some blood.

The second series of preparations shows the whole canal as it is seen on antero-posterior section, when the mucous membrane of the septum is removed. Here the organ of Jacobson is seen as a blind tube, attached to the bony septum, which is grooved for its reception. A probe, introduced by the anterior opening through the incisor canal, penetrates to the cul-de-sac which terminates the organ posteriorly. It is seen that the direction of the canal is slightly ascending from before backward, that its lumen easily admits a No. 5 Bowman probe, and that its length does not exceed four or five centimeters. To show the opening of the canal of Jacobson in the anterior palatine canal, I have resorted to a somewhat more complicated preparation; on a grooved sound introduced into the incisor canal by its inferior osifice, I have cut the lower wall of this canal, the upper wall being thus exposed, one sees on the anterior third of this wall a very small antero-posterior slit-like opening, attaining, in the cow, a length of six to eight millimeters; a probe introduced into this opening and pushed upward and backward penetrates directly into the canal of Jacobson. This relation of the two canals is not very easy to see well. It is however, sufficiently clear in the present specimen, which shows the anterior segment of the palatine arch of the cow, with the anterior palatine canal opened along the inferior wall.

Such is the demonstration of the gross anatomy to which I limit this study, reserving, to treat elsewhere, other questions, not less interesting, but which I cannot approach to-day without detaining you too long. It suffices for me to show, that although less well supplied in this respect than the sheep and cow, we possess, like them, an organ of Jacobson; that the most probable representative of that organ in the human nasal fossa, is a cul-de-sac buried in the mucous membrane of the septum about eight and a half millimeters from the floor of the nares, and twenty three millimeters from the point of junction of the lip with the membranous septum (Koelliker); that the orifice of this canal does not exceed one millimeter, it is almost always possible to find it on the cadaver, and that M. Potiquet was successful in the catheterization of it on the living subject. As for the cartilaginous envelope which we have just seen formed a continuous tubular sheath around the fibrous sac, it has undergone, in mass, a complete transformation, not only in its appearance, but even in its situation. It seems to be represented by the longitudinal plates described by M. Sappy under the name of "Posterior Accessary Cartilages," and situated on each side of the septum, above the antero-inferior nasal spine, at the level of the inferior angle of the quadrilateral cartilage.

THE

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# AMBLYOPIA FROM SUPPRESSION OF THE VISUAL IMAGE.*

BY WALTER B. JOHNSON, M.D.,
PATERSON, N. J.

In convergent strabismus, except the squint be of the alternating variety, there is present an amblyopic condition affecting the squinting eye, in which there is more or less marked diminution of the vision.

Hypermetropia was thought by Donders and many other writers to be the most frequent cause of convergent squint, constantly exciting excessive efforts at accommodation, resulting in convergence, confusion of images and subsequent mental suppression of the visual image of one eye. finally terminating in an amblyopic condition, in which the ability to see varied, vision being more acute in some cases than in others.

It has also been claimed by Schweigger, Alfred Græfe and others that amblyopia is not caused by squint, but exists as a primary or congenital condition probably caused by some change, structural or otherwise, in the eye itself or in the nerve centers. This produces convergence in consequence of confusion of images caused by deficient sight.

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* Read at the twenty-ninth Annual Meeting of the American Ophthalmological Society at New London, Conn.

The variety of amblyopia or suppression of the visual image in question is apparently a purely physiological condition. Ophthalmoscopic examination indicates a perfectly normal fundus, although the eye is generally hypermetropic. The nerve centers must certainly be affected by the continued mental suppression of the visual image and their functions finally practically suspended. Unless an operation be performed, which results in re-establishing binocular fixation and fusion of the retinal images, the amblyopia persists, being a progressive mental condition made permanent in the nerve centers by their loss of use and exercise of the power of vision. Amblyopia may be and sometimes is overcome, when it is first established, by a proper correction of visual defects; the commencing squint and the increasing loss of sight may thus be entirely prevented without resort to operative interference. Squint generally appears at an early age, when satisfactory examination is not practical; the amblyopic condition may be present but not demonstrable; for that reason the time of loss of vision can not be definitely ascertained and the question of the probable presence of amblyopia before the onset of the squint, or of its onset as a result of the squint, is very difficult of solution and proof. It is presumed that an amblyopia may come on as a result of squint and persist forever after even though the eyes are brought to a state of apparently perfect parallelism by operation. The vision in the amblyopic eye rarely, if ever, becomes equal to the vision of the fellow eye. The squinting eye cannot, does not, and will not enter into the visual act and has no ability to, and can take no cognizance of any object which appears on its visual axis, the power of suppressing images having become a condition and the vision decreased to such an extent that the eye is practically sightless.

The case here reported, which presents the character and history of many other cases of concomitant convergent strabismus, shows conclusively that, whatever the change which led to the loss of vision, it was not structural either in the eye ball or the nerve centers, but was in all probability a pure case of amblyopia which resulted from the long continued mental visual suppression induced by the confusion of images caused by the loss of parallelism of the eyes, and that the amblyopia was in all probability the result of the squint.

The amblyopia having entirely disappeared after the loss of the fixing eye, when all the existing conditions were changed, indicates the certainty that in this case amblyopia was a condition and not a disease. The remaining eye which had been apparently almost sightless, having become excessively amblyopic, after instruction and exercise designed to assist the visual effort, gradually increased its power of vision until perfect sight resulted and the sensitive point returned to the region of the macula lutea. The results of any passed amblyopic condition entirely disappeared, the eye-ball itself and the nerve centers returning to a perfect state of health and visual acuity.

T. McK., age 19, June 3, 1887. File forger. Has been cross-eyed since he was three years of age, and states that during his recollection he had been unable with the left eye to discern any object and define its character.

He has a manifest hypermetropia and constantly fixes with the right eye.

R. V. = $\frac{20}{15}$; $\frac{20}{15}$ w. plus 1.25 D.

L. V. = fingers at 6″, no improvement with glasses.

The fundus was apparently normal.

He applied for treatment intending to have his squint corrected by tenotomy.

June 13. While working at forging, a hot file flew from his tongs and struck him in the right eye.

Two hours after the injury the eye-ball was examined, a large wound of the globe was discovered, having extremely ragged edges and involving almost the entire globe, cutting through the cornea, iris, lens and sclerotic in the cilliary region. Enucleation was advised and performed in the usual manner in the afternoon of the same day.

June 18. The patient was doing nicely and stated that he believed he could see better.

L. E , V. = fingers at 3′

Ophthalmoscopic examination discloses a perfectly normal fundus and a hypermetropia of plus 1.50 D.

June 19. He was first instructed in locating letters on the test card. His field of vision was limited to any object upon which his attention was fixed. If placed directly in front of a test card with the region of the macula in the axis of vision he could see $\frac{3}{200}$. If allowed to read the letters on a plane of his own choosing, bringing the hypersensitive retinal spot into use, and wearing plus 2. D. the test card would appear to be thirteen inches to the left of its actual place of hanging, but he was able to read $\frac{2}{70}$ and as his instruction was continued he read $\frac{2}{15}$, and at times $\frac{2}{12}$ and $\frac{2}{8}$, the letters being moved ten inches to the left of their actual position. He finally read $\frac{4}{15}$.

June 20. After fifteen minutes instruction he was able to read $\frac{20}{30}$ w. plus 1·25 D. on a new test card, never seen before, stating that in order to see the card he was obliged to look to the left of it, although he apparently saw it directly in front of him. He could read $\frac{20}{200}$ without a correcting glass. Although there are six cards on the test frame, he insisted that he could only see one of them at a time and that in its false position.

June 21 to 25. He has been instructed daily with constant improvement in the field of vision and in the rapidity with which he could locate the letters and cards, plus 1.75 D. having been ordered and worn constantly.

June 26. He is able to select letters on any of the test cards and now locates the card in its exact position, and can see all six cards at once without special effort. His vision for near was tested for the first time since the loss of his eye with plus 1.75 D. He was able to read Jæger No. 7, but in locating a word on the test paper, with a pointer, he would point considerably to the left of its actual position.

July 1. The improvement has continued daily, since last date. He can read $\frac{20}{15}$ with his correcting glass, and Jæger No. 1, at 12 inches, locating the words with a pointer in their correct places. He dsclined to accept the plus 1.75 D. he had been wearing and was ordered plus 1.25 D His visual field is normal.

Jan. 23, 1890, nearly three years after the loss of his eye.

His vision = $\frac{20}{15}$ with or without plus 1.25 D. He reads Jæger No. 1 with or without any correcting glasses, although he prefers his plus 1.25 D. for reading.

He never has had any pain, or discomfort, or any blurring of his sight since last examined, and has worked at his trade constantly since that time.

## DISCUSSION.

Dr. Samuel Theobald, Baltimore:

The case is an exceedingly interesting one and I am not aware of a similar one having been reported, where through the loss of the good eye, the amblyopic squinting eye being forced to take part in vision, has so rapidly and completely recovered visual power. I think that the Doctor is justified in the view that he has taken of the significance of the case. It is extremely improbable that a *congenital* amblyopia would entirely disappear as happened in this instance. The case offers strong testimony I think in favor of the view combated of late years by Schweigger and Alfred Græfe, but which I attempted to defend several years since*, that the amblyopia of squinting eyes is a consequence and not a cause of the squint.

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* Trans. Am. Ophthal. Soc., 1888.

Dr. Herman Knapp, New York:

This case is the best evidence of amblyopia ex-anopsia that I know of. I have had one case somewhat parallel. An old lady had cataract in an eye that had squinted from youth. She was operated on by Schweigger and I had to make an operation for secondary cataract, by which she got vision $\frac{20}{\text{XXX}}$. This case comes near to that of Dr. Johnson, but it does not furnish a complete evidence of amblyopia ex-anopsia and subsequent improvement of sight as the latter had not been tested before the cataract developed.

Dr. Henry D. Noyes, New York:

This is the first case in which I feel any confidence in the assumption that the amblyopia was acquired. It is the only one I know of, equally remarkable, except one of Javal. Javal had a case in which he brought the vision up to normal after three years exercise. It must nevertheless be distinctly stated that a case like this only proves that very defective sight belonging to the unused eye, is capable sometimes of remarkable improvement. It does not prove anything as to the source of the defective function. The two things are logically entirely distinct from one another. I am willing to concede that, in a portion of cases of strabismus, the amblyopia may be acquired and is not congenital, but I am far from being convinced that the majority of them are of that character. I have examined an enormous number of cases in which there is congenital amblyopia of one eye without squint. I intend to put on record my cases of congenital monocular amblyopia with refractive error. These cases are much more common than is usually supposed.

In regard to this particular case, I should have been glad if examination had been made to determine whether or not there had been color scotoma at some period of the history. Color scotoma is very common in amblyopia and strabismus. Furthermore, other conditions obtain. I recently saw three cases of strabismus. In one, the squinting eye had an absolute scotoma of ten degrees, with absolutely no light perception. The patient was a woman 28 years of age who had been operated on in each eye, but the squint had not been cured.

The most probable explanation in favor of the view that squint amblyopia is acquired, is on the assumption that the cerebral part of the visual function is in suspense, and by continued suspension loses conscious activity. This however is a very different thing from the usual assumption which makes the lesion ocular.

In opposition to this view are numerous cases where persistent scotoma, persistent dimness of sight argues in favor of a local lesion in the eye, which I do not believe is the result of disease.

An interesting feature that Dr. Johnson records is the improved projection in looking at an object. It seems to me that might have been corrected by a tenotomy of the internal rectus. In time, he overcomes that. That is a fact that is frequently observed in dealing with strabismus when you attempt to restore binocular vision.

I may perhaps make this remark with the view of assisting in the determination of central scotoma: If you have a patient whose vision in the amblyopic eye may be $\frac{3}{x}$ and type consisting of a line of five letters; you ask him to look at the middle letter and he will tell you that he can not see it, but that he sees those on either side. Then you may change his point of fixation from one point in the line to another. You will find that the object on which he attempts to fix is not clear, while objects excentrically placed are seen. This is better than the perimeter. You can do it with the perimeter or better with the black-board.

Dr. Samuel B. Risley, Philadelphia:

I think that the existence of amblyopia ex-anopsia in convergent strabismus can no longer be doubted. I some time ago recorded a group of such cases in which the presence of amblyopia from disuse was demonstrated. In one case the right eye which was amblyopic had been operated on to correct a strong convergence and after four years the case came under my observation, the left eye now being the squinting eye. The right eye before the operation had been almost blind, but was found with V. = $\frac{6}{7}$. In each eye there was hypermetropia of 3 D. She could barely count fingers with the left, fixation being eccentric. The right eye had normal acuity of vision, $\frac{6}{6}$. I did tenotomy on both interni, corrected the refraction and insisted upon exercise of the amblyopic eye for half an hour, morning and evening, the right eye being excluded by a bandage. Vision steadily improved so that at the end of three months it had come up to $\frac{6}{7}$. Here was an instance where the amblyopia had existed at different times in each eye and had been recovered from.

Another case was that of a small boy aged 2 or 3 years who was brought to me with developing convergent strabismus. I followed my usual habit and placed the eyes under a mydriatic, gave smoked glasses and exercised the right eye, which showed the greatest tendency to convergence, and followed the boy through three years. Finally he had learned his letters and I found that he had vision of $\frac{6}{7}$ or $\frac{6}{9}$ in each eye with correcting glasses. He had hypermetropic astigmatism with asymetrical axes. Finally after an absence of six months, he came back and vision had sunk to $\frac{1}{3}$ in the right eye and maintained its former standard in the fellow eye. I then placed an opaque disc between the glass and the eye on the right side, and had him wear this morning and evening. Under this, vision came up once more to $\frac{6}{12}$ and some letters in $\frac{6}{9}$. In other words, it distinctly improved under exercise, and the exclusion from vision of the fixing eye. After watching the case for a few weeks longer, I did tenotomy on the right eye with the result of correcting the tendency to convergence and restoring binocular sight. Two weeks from the date of the operation, vision was $\frac{6}{6}$ in each eye with correcting glasses. I think that with the evidence of such experience, we can no longer deny the existence of amblyopia from disuse, and must admit that all these cases certainly are not congenital, since the amblyopia developed under observation and disappeared under the measures adopted for its relief.

Another case which has already been published was that of a child, the daughter of a physician, who had convergent strabismus with vision reduced to one-half in the squinting eye. I corrected the existing hypermetropic astigmatism with the result that the strabismus, which before had been fixed, became periodical. She came back after several years, on account of headache following work at a near point. The strabismus had been so entirely removed by the use of glasses, that I did not suspect it to be a case of strabismus until the former record was consulted. Vision was perfectly normal in each eye, i. e., the amblyopia had disappeared. In view of these clinical facts it is futile to deny the occurrence of amblyopia from disuse.

Dr. B. Alexander Randall, Philadelphia:

Cases of cure of amblyopia ex-anopsia will but rarely be recorded in spite of the challenge of these who deny such a condition.

These cases must always be difficult to definitely settle, because of the youth of many of the patients and the difficulty of applying the tests of vision in such cases. A case that has greatly interested me is one that has grown up under my eye. Strabismus occurred periodically in the second or third year, always with fixation of the right eye. Mydriatics relieved the habit to a certain extent, up to about the fifth year; but the strabismus then became nearly fixed and glasses seemed necessary. A glass of some 6 D. was given and under its use the child began to see, she could learn her letters and I was able to determine that the now slightly converging eye had $\frac{20}{\text{XL}}$ contrasted with $\frac{20}{\text{XXV}}$ in the right. To-day, the hypermetropia remaining the same, and the case having never been operated upon, vision is $\frac{6}{6}$ in each eye, although the tendency to strabismus has never been wholly overcome. She has full normal vision, rather better in the left eye, which still tends to converge; and turns strongly in the moment her glass is removed, and ordinarily she has no difficulty with vision with both eyes. The eyes working in perfect harmony with normal vision.

Each of the other less hypermetropic children has had periodic strabismus; but has escaped with only a need for glasses at near work, vision having always been normal in each eye.

Dr. Samuel Theobald, Baltimore.

The region in which the highest grade of amblyopia exists in the squinting eye has I think an important bearing upon the question, whether the amblyopia is due to the squint or is a congenital condition. The retina is most amblyopic about the yellow spot, and to the nasal side of this region in convergent strabismus; while in divergent strabismus it is the macula and the temporal portion of the retina which are most affected, just where it is most important in order to prevent diplopia and confusion of vision, that the retinal image in the squinting eye should be suppressed. The other portions of the retina are much less amblyopic. A case illustrating this point has occurred to me. A young woman of 25 years had a convergent squint without diplopia. I did a tenotomy upon one internal rectus, leaving a considerable residual squint, and still no diplopia. Then I divided the internal rectus of the other eye, and got a slight over-correction, and at once there was diplopia. The moment the retinal image through the over-correction produced by the second operation fell upon the outer side of the yellow spot, there was diplopia, the vision in this region of the retina having remained comparatively unaffected, because the images formed upon it, caused little or no confusion of binocular sight and so were not mentally suppressed.

Dr. E. E. Holt, Portland, Maine.

Several years ago (1885), I read a paper before the Society entitled, "Strabismus, its correction when excessive and in high degrees of Amblyopia", in which I described the method I had then practiced seven years of advancing the weakened, attenuated muscle in conjunction with tenotomy of its opponent which maintained the deviation in these cases. I reported a case in which this double operation had been performed when several tests showed the eye operated upon was blind, but after the operation, finding there was sight, practice brought the vision up to $\frac{1}{24}$. Some of the members of the Society doubted the accuracy of the records, although it was related that several tests were made with the same result. I think continued practice with strong lenses will give surprising results in some cases, but it requires patience and perseverance.

Dr. W. B. Johnson, Paterson, N. J., closing:

It seems to me that the peculiarities, in this case, are the length of time that the amblyopia had persisted, the return of perfect vision, and the shortness of time required for the vision to become normal. I was surprised to hear cases reported to-day in which, after operation for squint, vision, in the amblyopic eye became perfectly normal In my case vision became normal, in the amblyopic eye, but there was no counteracting features on account of the loss of the eye, which had previously performed the entire visual act. In my experience, I have failed after operations for squint to find perfectly normal vision restored to the squinting eye, even when binocular single vision was attained.

The physiological central scotoma which Dr. Noyes speaks of was present. The period of time required for the return to normal vision was, from the thirteenth of one month to the first of the following month, the vision then being $\frac{20}{15}$, with a correcting plus lens and subsequently becoming $\frac{20}{15}$, with or without such correction. It would seem to be established, that almost complete loss of vision from amblyopia certainly can and does exist without any diseased condition being present either in the eye itself, or in the nerve centers; that amblyopia is in that case due to the continued "supression of the visual image," which is a condition self-limiting under certain circumstances, and not a disease either causing or caused by stribismus.

# SYMPATHETIC OPHTHALMITIS,

Clinical lecture delivered before the Northwestern Wisconsin Medical Society, at Stevens Point, July 11th., 1893,

By H. V. WÜRDEMANN, M.D.,
Milwaukee, Wis.

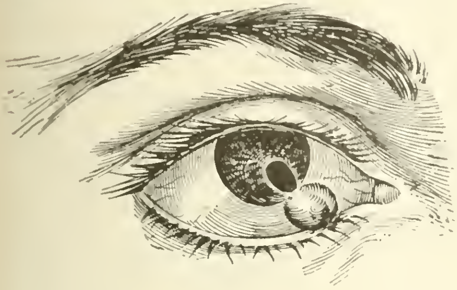
Gentlemen:

We have before us two interesting cases of ocular traumatism from which correct inferences should be drawn as to management. Every surgeon realizes the importance of that bugbear of ophthalmic practice, that disease whose insidious course lies, not in the injured eye, but in its fellow, and which having once gained a foothold eventuates in perhaps utter blindness. To those who have temporized with injuries of the ciliary region of the eye or have had sympathetic ophthalmia following an operation on the eyeball, this disease seems indeed an awful visitation. All of us of any experience in ocular therapeutics have seen such cases. It is commonly considered that punctured wounds of the ciliary region are almost invariably followed by this affection in the other side; and such cases are legitimate subjects for enucleation of the injured organ, despite the fact that vision may yet be good. But cases of sympathetic trouble are known to have arisen from other causes, although such traumatisms cause about 80% of the disease.

Foreign bodies within the eye, incarcerations of the iris, ciliary scars, luxation or calcification of the lens, ossification of the ciliary body or choroid, tumors, incarceration of the optic nerve in the stump after enucleation, ill-fitting eye-shells and last, but not of least importance to the surgeon, is the fact that such operations as cataract extraction or discission have caused sympathetic disease.

Two forms of sympathetic trouble may be differentiated. The one is sympathetic irritation or neurosis, in which there may be but few signs of a pathologic process going on in the injured eye, which may have acquired the traumatism anywhere from a couple of weeks to many years before. There is, however, congestion of the ciliary region and deep-seated pain on pressure, showing that the eyeball is not quiet. In the sympathizing eye there may be dimness of vision, photophobia, defective accommodation, contraction of the visual field, neuralgic pains and hyperemia of the fundus. Any or all of these symptoms may be present. The patient may complain that he has had several attacks of "sore eyes" with intervals of quiet. It is a debatable question whether this passes into the graver forms of sympathetic ophthalmitis in which all these symptoms are more pronounced and which is attended with serous iritis, iridocyclitis etc. Many of the latter begin as a neuro-retinitis, as in one of the cases before you. It is possible that both the neurotic and the microbic theories of sympathetic disease are correct, as I am sure that many patients have recurring attacks of sympathetic irritation without permanent impairment of vision in the sympathizing eye, and in the course of many years have not had ophthalmitis. Whoever has seen the rapid production of sympathetic inflammation of a high degree after an infecting wound of the ciliary region will not question the theory of microbic migration brought forward by Deutschmann.

Case 1. The first case we will consider is that of this young man who had an incised scleral wound some eight years ago. He comes to us on account of poor vision in the injured eye and about the defect in his personal appearance. You will note that the pupil is drawn downward and inward, and that there is a well defined translucent swelling about the size of a grain of corn under the conjunctiva at the corneal limbus (see fig 1). At first sight this seems a dislocated lens and the suspicion is apparently confirmed on testing his vision and using the ophthalmoscope for the eye is highly hyperopic and may be thought to be aphakic. By careful examination we find that there is a high degree of compound hyperopic astigmatism (approximately, + 2·00 ⊃ + 8 00 cyl., 90°.)

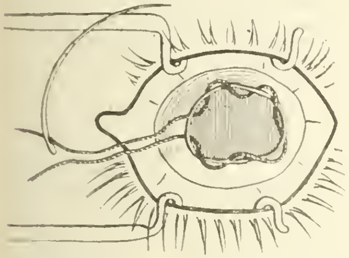


[Fig. 1.]

The mode of determination of aphakia especially difficult in this case, is as follows: observe the reflection of the ophthalmoscopic mirror on the anterior surface of the cornea, this is large and bright and moves *with* the direction of the mirror: there should be a second reflection of the anterior surface of the lens a little smaller, and rather faint, moving in the *same* direction, and a third bright but small image from the posterior surface of the lens, moving *against* the mirror. Where these three images can be obtained, aside from the fact that an aphakic eye is usually 8.00 to 10.00 D. hyperopic, we may say that the lens is still in the eye. This then is a cystoid degeneration of the cicatrix with impaction of the iris which some day may give rise to trouble. It would have been good practice to have enucleated this eye shortly after the injury as it is one case out of a hundred: ninety-nine other cases would have probably given rise to sympathetic disease on the uninjured side. The vision of the other eye is normal and there is no history of trouble. What should be done in this case? On account of danger of the protuberance being injured from accident as well as for cosmetic purposes, it would be well to cut off same and sear wound with the galvano-cautery. Case should be watched for weeks afterward. I would not excise this eye at this late time unless sympathetic symptoms should set in.

Case 2. In this old man you will notice that both eyes are inflamed. A blow upon the right eye eight years ago was followed by blindness of same some months later. While feeding cows one month ago he was again struck in the same eye, but as far as the history goes and judging from external appearance it seems that there was no external wound of the eye-ball. There was severe bruising as is evinced by the remaining unabsorbed blood-clot in the anterior chamber. As well as I can determine through the clouded media there is an opaque dislocated lens in the vitreous. The ciliary region is tender and very painful to the touch. Tension is decidedly diminished The vision of the other eye has been failing for two weeks, there is marked ciliary congestion, cloudiness of the vitreous, the pupil is movable although somewhat inactive to light. The picture by the ophthalmoscope is pronounced. The edges of the optic disk are blurred, the vessels decidedly tortuous and dilated, and whole fundus is hazy. There is no question but what we have here a beginning sympathetic ophthalmitis and the injured eye should be enucleated at once. It may already be too late and the process may develop into a full-fledged sympathetic ophthalmia going on for months or even years. His chances are about even that immediate operation will stop the process. Enucleation during the first few days of a sympathetic ophthalmitis or even before the disease has set in does not guarantee against stoppage of the process. Two years ago I enucleated an eye, in the mate of which there was less trouble than in this case, and yet sympathetic disease progressed, and the patient is even now under observation as the eye although blind is not quiet The patient refused a second enucleation and the disease has run its full course. An interesting point in this man is the fact that there has been no penetrating wound of the eyeball and yet indubitable sympathetic ophthalmitis has set in.

The patient was then anæsthetized by ether and the eye removed, the optic nerve being divided as far back as possible and the operation being finished by gathering the edges of the cut conjunctiva with a cat-gut suture in a pouch, the capsule of Tenon and muscular attachments being included at the same time. (See Fig. 2). The eye socket was filled with vaseline and a strip of iodoform gauze laid between lids. Gauze bandage and cotton applied for the outer dressing. In my experience the formation of a good stump by the pouch suture is highly advantageous and should be done in all cases except those in which there is orbital cellulitis and where drainage is to be desired. In no case that I can remember have I been obliged to take out the suture by reason of retained blood clots or have not had union by first intention. The formation of granulations and adhesions, a frequent result where the orbit is simply packed with gauze and the wound left open, is thus avoided; and, as a rule, an artificial eye may be fitted within a week from date of operation although of course the fitting should be deferred if possible until all traces of the operation have passed away, as a better fit may be then obtained. In movement and shape the stump resulting from this operation is ideal.



# THE SIMPLEST AND MOST PRACTICAL ELECTRIC APPARATUS, ESPECIALLY FOR GALVANO-CAUTERY OPERATIONS.

ARTHUR G. HOBBS, M.D.,
Atlanta, Ga.

Member of the American Medical Association; of the Pan-American Medical Congress; Ex-president of the American Rhinological Association; Member of the Georgia State Medical Association; and fellow of the Atlanta Society of Medicine; etc., etc., etc.

The little apparatus that I am using especially for galvano-cautery operations, is the only perfect appliance for that purpose in my knowledge. It has been used in my own and assistants' rooms, perhaps a thousand or more times during the last year, and in no instance has it ever failed us, or caused us any care or trouble. Indeed no thought of its presence is ever suggested until it is needed for actual use, quite unlike any of its predecessors, even the best of which required an occasional charging. It is small and compact, contained in a mahogany box eight inches long, four inches thick, and four inches deep and is securely screwed to the wall at a convenient distance from the operators chair.

The wires from an alternating current of 52 volts, the most generally used circuit, particularly in the medium and smaller cities, are brought into the operating room from the street wires, and attached at each upper corner of the little box. The conducting wires are similarly attached to the lower corners.

The apparatus is now ready to be used for the cautery, the magnet, or for the small incandescent lamp, and it remains always and ever ready. When the moment for using it arrives it is only necessary, first to turn a screw, projecting from its nearer surface, with the left hand, while the instrument is held with the right. It thus serves as a gauge for measuring out the exact quantity of electro motive force in the form of heat, magnet power, or light, by modifying the 52 volts conducted to it from the nearest street transformer, into the fractional number of volts that may be required for the occasion.

As both the force and ampereage in actual use with this transformer is acquired by induction, and is not in direct contact with the initial current, there can be no possible danger to either the patient or operator, even if the initial wires should by accident come in contact with more powerful wires.

The electro-motive force can be gauged between one and sixteen volts by the screw, and the amperage is determined by the resistance of the conducting wire.

The cost of the electric supply is very small, perhaps two or three dollars per month for all ordinary purposes, including the rent of the metre.

It is quite as easy, by modifying the force with a slight turn of the screw, to adapt it to the forehead lamp in ear operations, and to the still smaller lamp used for translucent and direct illumination in the small cavities, as in antrum diagnoses.

A much smaller cautery handle than the conventional one is more convenient for actual use, while in addition to this it may be permanently attached to the conducting cord where it is always at hand, requiring only to change the point to suit the occasion. The larger handles are necessary, however, for the wire loop operations.

The needle and a very narrow blade are the only cautery points used in my office, and in all cases they are made to enter at the most prominent part of the hypertrophied tissue, penetrate down to the bone with a white heat and then withdrawn through the same puncture while the point is hot. In no case is a wholesale destruction of the mucous membrane ever produced by applying the flat surface of the blade to the protruding part.

The needle and the narrow blade produce little or no pain when an application of a ten, or twenty per cent. solution of cocaine has been locally applied on a cotton probe, ten minutes before the operation. The annoying constitutional symptoms, that not infrequently follow even a weak spray, are rarely encountered when a many times stronger solution is applied to a limited area of mucous membrane surface.

Its easy control renders it the most reliable and certain means for making cautery operations on the cornea, because of the small amount of electro-motive force required to heat the fine points used for this purpose.

This means of treating corneal ulcers, and I may also add, of reducing the corneal part of a pterigium, is not only less painful than any other, but the resulting cicatrix is more transparent, provided the cautery is not allowed to touch the healthy cornea.

A pterigium will in some cases need no farther operative procedure, although it will usually be necessary, in addition to the cautery, to sever the vascular supply, without excising any part of the hypertrophied conjunctiva except when it is decidedly thickened.

The magnet in general use is constructed for the continuous current, yet it can be charged for the lighter uses with the alternating current. My electrician is now adapting one of these magnets to the alternating current of the apparatus.

The electric motors heretofore used for fans and drills were supplied with the continuous current only, but some are now being adapted to the alternating current.

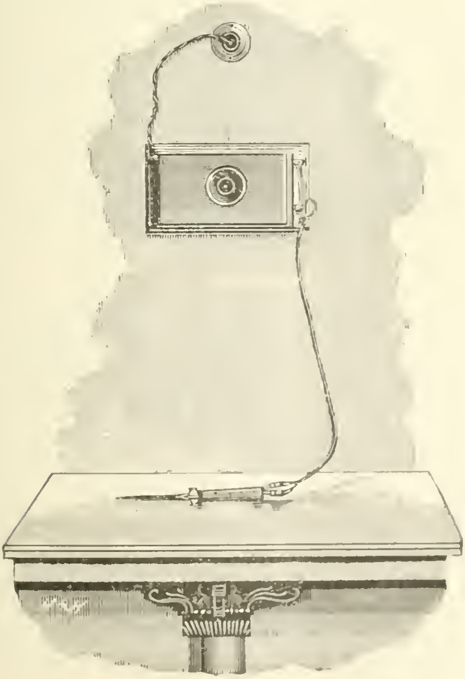
In addition to these varied purposes that this little apparatus may be called upon to serve, the current that supplies it may be still farther utilized before its entrance.

For example, it will light two incandescent lamps, and at the same time run two fans or drills where the motors are suitable, and still supply the transformer.

While the volume of the current, or ampereage, is large, the electro-motor force can be reduced sufficiently for therapeutic uses where the alternating current is advisable.

In short, it is safe; it is inexpensive; it is always ready; it is reliable; it exacts no time or attention; it dispenses its force and volume in many practical ways; it occupies but little room and is not unsightly; it does its work perfectly, and if it once gains an entrance to the consultation room of one who resorts to electricity in many of its varied forms it will become a fixture.

In the cut below the conducting wire is represented too short. This double wire should be large in order to reduce the ohms or resistance to a minimum, and long enough to conveniently reach to the operating chair.



## The Scientific Proceedings of the Section of Ophthalmology of the American Medical Association, at the Milwaukee Meeting, June, 1893.

*Discussion of Strabismus Continued from page 154.*

Dr. Hotz:

I agree with the main statements of the author and wish only to make a few remarks on the subject of advancing the muscle, in-as-much as I prefer the resection to the advancement of the weak muscle. I divide the tendon of the muscle, leaving a short stump at the line of insertion and then cut off a piece of the tendon, in proportion to the degree of convergence, and attach the muscle to its original place by stitching it to the stump. We gain several points by this method: In the first place we can gauge the effect to a certain extent by the size of the resection: we are sure we have a firm hold for our stitches, and they will not slip as they are so apt to do when they are through the conjunctiva only; we further-more know that the muscle will be held to the eye-ball in exactly the same line that it was originally attached. But whether we do advancement or resection, the opperation should always be accompanied by the tenotomy of the contracted internal rectus muscle.

Dr. LeMond:

If we were all of one mind in this department and never differed with each other, it is quite likely that ophthalmology would never have reached the stage of perfection and exactness that it enjoys to-day. I must say that atropia, in my hands, has not been satisfactory, in fact, I rarely ever use atropia in connection with these cases. In ninety-eight per cent. of the cases of squint I have operated on in the last year (about fifty cases) I have had a decidedly unsatisfactory result in one case.

I invariably find in these cases a vast amount of hypermetropia, and I really believe that in nearly all of these cases of squinting eyes, hypermetropia is at the bottom of it. After the operation, I correct the error of refraction and tell these patients that they will have to wear glasses from six to twelve months perhaps, but likely by that time they will be able to go and see comfortably without them.

This course of treatment, with me, has been very satisfactory. In two cases I had to use the stitch to hold the eye *in situ*. I only do this where a complete tenotomy of the muscle has failed to put the eye on the same visual axis with its fellow. I prefer using the stitch to doing repeated tenotomies. I think the ambliopic condition is due largely to a great amount of hypermetropia. In my experience I have found the ambliopia confined to the squinting eye. I believe whenever we look more carefully to the eyes of school children the less squinting we will have, simply by applying the needed remedy, that of prescribing glasses.

Statistics show that the Germans double and thribble us in the number of glasses worn, according to the same given number of population. I think this proves to us, very conclusively, that they are just that much ahead of us in finding the early errors in refraction and cerrecting them.

Dr. Gibson:

I want to make one remark only, in favor of the advancement that has been spoken of. It does away with that protrusion of the eyeball which we have as a result of a simple tenotomy. That I think a very essential thing to take into consideration. I have seen this protrusion quite marked in some simple tenotomy operations. Combined tenotomy and advancement certainly gives better results.

Dr. Thompson closing:

I am much pleased at the interesting debate on my paper. Regarding the ambliopia of squint: I have been suprprised to find in children two or three years old, the bad vision in the deviating eye, when that eye had only squinted a few days, certainly not long enough for the sight to fail from disuse. From such experience and from the tone of some ophthalmic writers, I am inclined to think there is a great deal of doubt about the truth of amblyopia ex-anopsia. Children born with cataract and successfully operated upon some years afterwards do not, as a rule, show up blindness. If the effect of disuse be true in one class of cases, why not true in the other? The use of atropia in children for the correction of squint is not, so far as I have been able to observe, satisfactory. I have tried it for months and do not know that I ever succeeded. If the squint is entirely due to hypermetropia I think it may be overcome by glasses. Indeed all such methods should be tried before resorting to an operation. I have relieved squint in boys of fifteen and sixteen years of age by correcting the hypermetropia, for when the glasses were taken off the squint would return. I have never seen a case of strabismus corrected in a young child by operation but that, when the subject grew to be fifteen or sixteen years old, there was loss of convergence or direct divergence. I have operated on children and got the most magnificent results, but when they grew up to adult age, I was ashamed of them and myself too.

ABSTRACT OF A PAPER ON

# BIFOCAL CATARACT LENSES,

By H. V. WÜRDEMAN, M.D.,
Milwaukee, Wis.

Dr. H. V. Würdemann, of Milwaukee, advocated Bifocal Lenses in aphakia and referred especially to their use after cataract extraction. The lenses should be ground with great care, of a high oval, and the reading shell should be cemented to the larger lens somewhat to the nasal quadrant. He has found it advisable to decenter lenses upwards from 1 to 4 P. D. varying with the requirements of the case in order to obviate the upward projection of the ground which is common with such strong convex lenses. The advantages gained for cataract patients by bifocal lenses are those acquired by presby-hyperopes and are obvious.

## DISCUSSION.

Dr. Murrell:

I have been using bifocal lenses after cataract extraction for a number of years. I have several patients wearing them now. My next-door neighbor has worn a pair for several years, has good vision and can read fine print all day long I advise the use of them.

Dr. Zeigler:

I have been ordering these bifocal cataract lenses for several years, in fact ever since bifocals came into general use. They are undoubtedly the most convenient lens for aphakic eyes. Even where only one eye has been operated upon, bifocals are far superior to the more clumsy "reversibles."

I think Dr. Würdeman has overlooked the very important "toric" or "ellipse" lens, which was presented before the American Ophthalmological Society by Dr. Harlan, in 1885, and subsequently discussed in a paper by Dr. Green. This lens is especially advantageous where we have a cylinder in combination with very high sphericals. It is composed of two cylinders ground on the same side of the lens, and at right angles to each other. As one cylinder is stronger than the other, we secure the effect of a sphero-cylinder; the balance of the spherical is then ground on the other lenticular surface. We thus practically divide the spherical on each surface of the lens, and then grind the cylinder on one of these spherical surfaces. This makes a much thinner lens than the old form where the cylinder alone is on one side, and the large spherical bulge is on the other. But aside from being a thin lens, its chief advantage lies in the fact that it furnishes a greater clearness of visual field, which will be promptly appreciated by the patient. This lens may also be ground periscopic. The bifocal slip can easily be added to either form. These lenses are accurately ground by John L. Borsch & Co., of Philadelphia.

Where the two eyes have been operated upon, I have sometimes prescribed a *distance* correction for one eye, and a *reading* correction for the other eye. This arrangement is particularly applicable in those cases where there is considerable muscular insufficiency. It allows one eye to enjoy clear vision for distance, and the other eye clear vision for reading. I ordered such an adjustment recently for a physician whose left eye I had operated upon for zonular cataract, while the right one still retained good peripheral reading vision. As there was considerable muscular deviation, in the vertical, a prism was added to the glass. He was ordered O. D. + 2. (for reading.) O. S. + 9. ⊂ P. 4° base down (for distance).

It may be well to bear in mind the fact that discomfort from the use of cataract lenses may be entirely due to muscular deviations, and we should order the proper prismatic correction wherever needed.

ABSTRACT OF A PAPER ON

# THE CURVILINEAR REFLECTION OF WEISS, AS A PRODROMAL SIGN OF MYOPIC DISTENSION.

By B. ALEX RANDALL,
Philadelphia, Pa.

Dr. Randall called renewed attention to this phenomenon as more often seen in his later experience, especially when sought with a short focus mirror, and stated that his enlarged experience corroborated the claim of Weiss, that it is frequently an index of myopic distention. It marks an exaggerated prominence of the nasal margin of the optic nerve coincident with the distension of the posterior pole, and whatever its precise etiological relations, seem to have distinct prognostic meaning. It should, therefore, be sought as a routine matter; and its presence, especially in young, distensible eyes, should be taken as a warning to use every precaution, by mydriatic rest, scrupulous correction of the refraction error, careful use and general good hygiene, to forestall the dangers of progressive myopia.

### ABSTRACT OF A PAPER ON

# EXCENTRIC POSES OF THE HEAD.

By J. E. COLBURN, M.D.,

Chicago, Ill.

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Mal-position or eccentric poses of the head may be assumed to prevent diplopia, or to relieve the strain put upon paralyzed, weak or illy balanced muscles. Some of the typical positions of the head and distortion of features occur as follows:

1st. Head thrown backward, mouth open, nostrils dilated, eyelids drooping.

2nd. Inclination of the head to right or left, chin retracted, mouth distorted and working.

3rd. Head bent forward, chin retracted, eyebrows elevated, forehead corrugated.

In eccentric poses of the above mentioned type there is binocular vision, and no distress is experienced from attempting to use the eyes, but as soon as the head is forced to the normal pose, diplopia or muscular asthenopia promptly occurs, though the motility of the eyes may not be abridged in any of the normal range of movements.

In another and rarer class of cases presenting the same eccentricities as to pose of head, there is partial or complete paralysis of one or more sets of muscles, diplopia with or without suppression of the double image, the head always moving in the direction of the seeing eye. The correction of the pose of the head must be accomplished by tenotomy and advancement, and by keeping the patient for a time, under the surveillance of some one who will keep them from following the habits already established. The head should be fixed in the normal position.

In the study of these cases I have used the corneal reflex, Stevens' phorometor, Maddox rod and prism, and various little modifications that are so purely personal that I see no reason for publishing them.

## DISCUSSION.

Dr. Gould :

I have had two or three cases that somewhat resembled those reported by Dr. Colburn. One patient carried his head back in order to avoid double vision due to heterophoria. By carefully adjusting glasses his mucles were strengthened so that he held his head in a normal position. One other patient had quite a distortion of his features, his forehead being wrinkled in concentric curves clear from his eye to the roots of his hair. It was very noticable After three months he was holding his head straight with the skin of his forehead nearly straightened out. I had still another case somewhat similar to this one.

Dr. Jackson :

I think that the class of cases to which Dr. Colburn has called attention is a very important one; and one to which the attention of the profession needs to be more generally directed. I feel like taking exception however to his classing them as cases of heterophoria. If I heard some of them correctly, they are rather cases of paralytic squint, in which it is impossible to obtain binocular vision, in the central portions of the field of vision. I have seen quite a number of these cases; and have also seen the other cases, which could be classed as heterophoria, because binocular vision could be obtained in all portions of the field, though only with undue effort. When Dr. Stevens gave us the new terms, the "phorias," I hoped that they would be applied only to cases of muscle error which correspond to concomitant squint: and that for these cases of special weakness in one muscle, or group of muscles, we might still use the very significant term—insufficiencies.

### ABSTRACT OF A PAPER ON

# EXOSTOSIS OF THE ORBIT,

By ROBERT FIELDS LeMOND, A.M., M.D.,
Professor of Diseases of the Eye and Ear in Gross Medical College,
Denver, Colo.

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When I received a letter last fall from the President of the Ophthalmic section of this distinguished body requesting me to contribute a paper on this occasion, I immediately began to cast about for a subject upon which to write. In the selection of a subject I had three objects in view, viz :—

1st. One in which great need existed for its further development to a more successful and satisfactory termination both to the physician and patient.

2nd. One in which there was sufficient gravity to claim the attention, interest and hearty co-operation of every ophthalmic surgeon present.

3rd. One on which I very much need to be enlightened myself. I believe it was Archimedes who said " if you desire wisdom, acknowledge your ignorance that your teachers may know where to begin."

I therefore present to you, the great God-head of Ophthalmology, the subject " Exostosis of the Orbit," a morbid condition which has successfully baffled the best skill that is known either in medicine or surgery to-day; because statistics show that over sixty per cent. of the cases which have been reported have succumbed either to septic meningitis or pressure upon the brain following the operation It is our duty as benefactors of the human race to make a great and united effort to overcome any evil which is claiming victims among our kind at the rate of from sixty to seventy out of every one hundred it attacks.

Regarding the etiology of exostosis of the orbit, comparatively little is definitely known. It often supervenes upon periostitis or ostitis, and is thought by a number of writers to be of syphilitic diathesis, as a positive knowledge of syphilitic complications has been known in a number of cases reported.

Again, it is thought by others that the osteoma is due to a diseased condition of the frontal or ethmoid bone, or of the frontal sinus, remote from a syphilitic cause.

These osseous tumors are usually very hard to the touch, showing, even at an early stage, a remarkable amount of resistance.

According to the best authorities, in the early stage of this trouble, the treatment should be to the promotion of all means of absorption by the internal administration of pot. iodidi, and a thorough saturation of the tumor locally with mercurial ointments. The patient's general health should be looked after closely.

A very large per cent. of exostoses occurs in persons under twenty-four years of age. In some cases it has been discovered in babes as young as one or two months old; and in one case, was found to exist at birth A large majority occur between the ages of ten and twenty years, and attacks about one out of every thirty thousand cases of eye trouble. Bornhaupt collected eleven cases of exostosis of the orbit which were operated upon, and out of that number, seven died of septic meningitis (63 per cent); two cases recovered, and two were lost sight of and the final results of their operations were never obtained. Berger and Tryman collected nine cases which were operated upon, six of whom died (66 per cent).

From the recorded experience of some one-hundred authors in this department of surgery, the average mortality will be some 65 per cent. I herewith append a unique case of this trouble:

A Mr. R., aged twenty-four, a very large and well proportioned man, weighing 190 pounds, who was complaining of double vision and a blurring of the right eye. In addition to the above symptoms, there was also quite an enlargement on the lower orbital bone of the same eye. It was continuous with the lower orbital bone throughout its whole extent It also extended upward nearly three quarters of an inch, and backward continuous with the floor of the orbit to near the optic foramen; the enlargement at this time was about the size of a pullet egg. The visual axis in the right eye was at an angle of about thirty-five degrees from that of the left eye. There was little or no inflammatory action present, nor had there been at any time since the beginning of the enlargement, which the patient said was about twelve months before. His vision in the right eye, at this time, was $\frac{7}{20}$. He was raised on a Missouri farm, and gave an excellent family history, having never had any serious sickness in his life. His parents were both living, as well as several brothers and sisters. The ophthalmoscopic examination showed no organic change, but there was a slight tortuosity of the blood-vessels of the retina. I told him that I was sure that, at the past rate of the development of the tumor, he would very soon be forced to one of two things: be operated upon or lose the eye. After advising with some of the members of his family who had accompanied him to Denver, he decided upon the former, and on the 17th of December, 1892, I performed the operation with the assistance of Dr. Coover.

## THE OPERATION.

The patient being completely anesthetized, I made a horizontal incision commencing about six lines below the internal canthus, and extended it to a little beyond the external canthus, cutting entirely through the integument down to the periostium. I then dissected the flap up until it could be laid back upon the super-orbital bone, which was held by my assistant. I then dissected up the periostium and began chiselling into this bony mass. I very soon concluded that I was pretty much in the same condition as the old pioneer, who wished for some one to help him turn the wild-cat loose, as I could see, by the way that it completely annihilated the edges of all my chisels, that I had a hard job on my hands. I took a very small chisel and succeeded in drilling several small holes into the bony mass; then, by means of bone pliers, connected these holes, which gave me a leverage by which I was enabled to pry off a number of pieces, thereby reducing this bony mass about two-thirds of its size. I then attempted to pry another piece out of the floor of the orbit, knowing that it would add very much to the utility of the eye; but in this effort I was completely foiled, as it was so unyielding that I felt, if I brought to bear any more weight on my pliers, I should certainly burst through the floor of the orbit, and possibly put my patient in a condition to need an undertaker instead of a physician. So we decided it was wisest to proceed no further, as we felt that the operation so far would be in a measure successful.

I then dressed the wound antiseptically, using a bi-chloride of mercury solution, 1 to 5000, about as hot as it was comfortable to bear, giving the wound a thorough drenching. I then drew the flap down and bound it in its former position with about half a dozen stitches; then bandaged his eye. The patient rested very well that night, and felt very comfortable the next day. After seeing him every day for about one week, I dismissed him, telling him, however, to call occasionally and let me see how he got along. He visited me about three times during the following month. By this time there was comparatively slight variance in the eye from its fellow; the diplopia was completely gone and his vision measured $\frac{20}{30}$ in his right eye, and believing I could that render him no further assistance

I dismissed him finally, feeling that I had every reason to be thoroughly satisfied with the result obtained.

## DISCUSSION.

Dr. Jackson :

The case I reported last year has continued well so far as I know. In that case I think it was a necessity, in order to remove it without enucleating the eye, to divide the tumor before trying to take it out. It was of excessive hardness, but after breaking several instruments on it I found it could be pierced by a hand drill.

Dr. Knapp :

This is certainly a disease which is extremely important. the majority of these tumors are in the upper-inner part of the orbit and spring from the frontal sinus. A goodly number are on the nasal side of the orbit and originate in the ethmoid. I had a patient on whom I operated for a tumor of this kind four hours, and got out only a small portion of the tumor itself. That man had an attack of meningitis and died eleven weeks after the operation. The tumor formed in the frontal sinus and penetrated into the skull. Such cases you see in large pathological museums, especially those in London. Hence the former advice: leave these tumors alone. I operated on a gentleman æt. 45, about thirteen years ago. The tumor was larger than a large walnut. I got it out by the method which Maisonneuve followed in removing a large intranasal osteoma, viz., by *subperiosteal enucleation.* It took me a whole hour. The patient made a rapid recovery without suppuration. He is living, healthy, and no one now could discover from which orbit the tumor had been removed. The method is essentially that followed in the removal of all growths, not by attacking and removing them piece-meal, but by shelling them out from the neighboring sound tissue. It has done me good service, particularly in cases of ivory exostosis of the orbit and the external ear canal.

Dr. Allport:

In this connection I would say I had a case of exostosis of the meatus some time ago that I successfully removed with the dental engine, not with the drill, however, but with some sharp burrs. The burrs became dull frequently during the operation, and I had to insert a number of them before I finished. I simply brought it to the top of the tumor and kept smoothing it down until I got down to the natural level and then stopped. I have also been using the dental engine in the same way in some of my mastoid operations. I simply burr off the outer surface until I get an opening. In this way I think we have a better method for operating on the mastoid. It is all done quickly and usually with success.

Dr. LeMond closing:

We are very much pleased to have Prof. Knapp present with us, and I feel complimented to have him discuss my paper. As I went over carefully his recorded experience I found it more extensive than any surgeon's in the United States, on exostosis of the orbit. I am very much pleased to have heard what he had to say.

In the last few months I have done two operations for exostosis of the external auditory canal. I had begun to think that perhaps I had better change my title and set up altogether for diseases of this character. I did both of these operations by means of the dental engine and a small chisel. One of these cases, a gentleman thirty six years old, told me this had been forming for about five years. It had completely occluded the external auditory canal and rendered it almost impossible for the ceruminous discharge to be removed. I took pieces of this bone to a Professor of Pathology and had it examined but it was found to be nothing but the ivory character of exostosis.

I beg pardon, Mr. President, for having digressed in mentioning the exostosis of the external auditory canal, and would not have done so had not one of the gentlemen, discussing my paper, introduced the subject. I was glad, however, the gentleman referred to it because it is a subject in which I am very much interested; and more especially, at this meeting, was I anxious to hear it discussed, from the fact of its being such a rare affection that you meet with in this department that it is a hard matter to get information regarding its characteristics. I have enjoyed the gladdened expectation of this hour, and was anxious to be enlightened upon this rare field of surgery.

I desire to thank Prof. Knapp especially for the kindly manner in which he handled my paper.

# Department of Otology, Laryngology and Rhinology.

Geo. H. Price, M. D., Editor, 621½ Church Street,
NASHVILLE, TENN.

## THE NEW YORK ACADEMY OF MEDICINE.

Section on Laryngology and Rhinology, Stated Meeting, held Wednesday Evening, May 24th. 1893.

DR. CHARLES H. KNIGHT, Chairman.

A modified electrical head illuminator was exhibited by Dr. Wendell C. Phillips. The illuminator consists of a six volt, four-candle-power lamp, which is fastened to the head by means of a steel band running from before backwards. It is light in weight, easy of manipulation and has a very perfect lens. By means of a thumb-screw at the side of the lamp cylinder, the focus may be regulated easily and quickly. Dr. Phillips said he considered the instrument an improvement upon the various forms of head illuminators now in use; it is especially serviceable in ear cases and in children, where it is difficult to keep the focus. The lamp is made of frosted glass, which gives an illumination without any spots. He also exhibited a modification of the lamp that is usually employed for antrum illumination. The modification consists in the lower half of the lamp being frosted. He also showed a rheostat which can be attached to a storage battery, thus allowing the battery to be used for both illumination and cautery purposes.

Dr. Robert C. Myles said he has experimented with the lamp shown by Dr. Phillips, and it has given better satisfaction than any other he has employed, It is especially serviceable for examining the ear.

### AN UNUSUAL CASE OF TUBERCULOSIS OF THE LARYNX.

Dr. F. E. Hopkins reported this case, and presented the larynx. The patient was a man, aged 52 years, a brick-handler by occupation, married and the father of healthly children. No family history of tuberculosis. The patient had always enjoyed good health until December, 1892, when he observed a slight hoarseness, accompanied by cough. This steadily grew worse. He also began to lose in weight. In February, 1893, he was compelled to give up his work. Physical examination of his chest showed advanced pulmonary lesions, aud the sputa contained tubercle bacilli in large numbers. The mucous membrane of the pharynx appeared to be congested. Examinations of the larynx revealed a strictly unilateral lesion affecting the left side. It consisted of a rounded tumor having a smooth surface and covered by congested mucous membrane. The swelling was firm and involved the arytenoid, the ary-epiglottic fold; and the ventricular band but did not extent beyond the larynx. The left vocal cord was entirely concealed by the overhanging mass. which extended nearly to the median line. About the centre of the tumor there was a slight depression, a clear cut ulcer, and upon the anterior edge of the ulcer there was a single prominence of granulation tissue. The left side of the larynx was absolutely immovable. With the exception of some congestion, the right side was free from any lesion. Externally, on the left side, a single lymphatic gland was involved This was of stony hardness, and remained unchanged during the period the patient was under his observation. The general appearance of the growth and its unilateral situation suggested malignant disease. There was no pain at any time, save in the act of coughing. There was some difficulty in swallowing solid food There was no tenderness upon pressure over the larynx externally. The patient complained of a constant feeling of dryness, limited to the left side of the throat. There was cough, with profuse expectoration, worse at night. The patient died on April 14th., 1893. The larynx was removed twelve hours after death. Sections of it, examined microscopically by Dr. H. B. Douglass, showed the mucous membrane to be almost totally destroyed by tuberculous ulceration, being replaced by tissue in a state of true coagulation necrosis. In certain portions, typical tubercles were present, with contents partly caseous. The submucosa was diffusely infiltrated with lymphoid cells and proliferating connective tissue elements. The glandular tissue near the surface was infiltrated with tuberculous products, and partly in a state of caseous metamorphosis. There was no evidence of pre-existing malignant infiltration or other pathological changes.

Dr. C. C. Rice suggested that the case might have been one of syphilis associated with tuberculosis.

Dr. Hopkins replied that anti-syphilitic treatment was instituted, without any result excepting to disturb the patient very much.

Dr. H. B. Douglass, who examined sections of the growth, said the case did not appear to be one of syphilis on account of the peculiarity of the infiltration and the presence of tubercles. The cells were lymphoid in character. The form of the tumor was also rather characteristic, being caseous in parts. There was no thickening of the blood-vessels. The elements of malignant infiltration were entirely absent.

Dr. Hopkins said the condition of the man was so desperate, even when he first came under observation, that such heroic treatment as curetting and the application of lactic acid seemed out of the question.

### INTERNAL MASSAGE IN DISEASES OF THE NOSE AND THOAT.

Dr. W. Freudenthal read a paper on this subject. Direct massage of the mucous membrane of the nose and throat, as has been shown by the experiments of Kronecker and Stirling, acts by thoroughly perfusing and filtrating the tissues, which not only furnishes new building material, but removes very quickly the asphyctic and obsolete secretions. This latter statement is explained by the fact that massage affects the lymph circulation also, because not only is the flow of lymph accelerated, but also the reflux of venous blood. Therefore, massage indirectly affects the resorption both of normal and pathological fluids.

This method of treatment is indicated in cases where it is desirable to stimulate the normal physiological functions of the organism, to produce a lively oxidation in the tissues, and to remove hyperemia and inflammation; furthermore, it is the best method of resorption of all those pathological products which can be returned to the circulation without detriment to the organism.

Dr. Freudenthal exhibited an electric vibrator which he has devised for the purpose of applying massage to the mucous membrane of the nose and throat. This instrument, which was manufactured by Mr. E. B. Meyrowitz, of New York, is attached to the wires of an electric battery; the extremity of the instrument, which is placed directly against the mucous membrane that is to be treated, is flattened in the shape of a small button, and when the current is turned on it makes about 132 oscillations each second. To use the instrument, neither practice nor dexterity is necessary. Any person accustomed to use instruments can operate it at the first trial. The instrument acts by tapping or rubbing the parts. At the beginning, when the patients are not accustomed to the treatment, the application is only made for five seconds; this time is lengthened at each visit. In this manner the entire surface of the nose and throat is manipulated. As to the class of cases in which this method of treatment is indicated: the author stated that he has successfully treated by means of internal massage a number of cases of chronic hypertrophic rhinitis, atrophic rhinitis and turbinated hypertrophy. In ozena he has not yet had an opportunity to apply the treatment, although such cases have been cured by it in Europe. He has treated a number of cases of hay fever, with marked shortening in the duration of the attack. Internal massage is contra-indicated in all parasitic and infectious diseases: furthermore, in all inflammations where the inflammatory product has developed a quality pernicious to the organism.

[*Will be continued in next issue.—Editor.*]

THE

OPHTHALMIC RECORD.

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# A FEW THOUGHTS ABOUT OPHTHALMOMETRY AS TO WHAT THE JAVAL INSTRUMENT WILL DO, AND WHAT IT WILL NOT DO.*

BY LOUIS J. LAUTENBACH, A.M., M.D., Ph. D.

PHILADELPHIA, PA.

Surgeon to the Pennsylvania Eye and Ear Infirmary, Chief of the Eye Clinic of the German Hospital, Etc.

The value of the Ophthalmometer, as a factor in the determination of the axis and amount of astigmatism, has for the past few years, given rise to considerable controversy. According to some it would seem as though the ophthalmometer had supplanted the subjective test, rendering the use of mydriatics unnecessary, and those who used them liable to be considered old fogies, "too sot in their ways" to appreciate the value of the more perfect and scientific method. Others consider it little more than a toy whose popularity will be ephemeral: and content themselves with the assurance that it, like many other medical fads, rests on an insecure foundation and will therefore soon be a thought of the past. Again, there are those who consider the instrument a scientific one, constituted on proper principles, and not a toy; yet know that the scope of its work is limited, and have endeavored to get from it all that is possible; and, while acknowledging its great usefulness, realize its limitations.

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* Read in the Section of Ophthalmology, Pan-American Medical Congress, 1893.

Those who have used the ophthalmometer, in other words, those who from experience know something of it, naturally belong either to the first or third group. Originally, the larger number of them belonged to the first class; but the third or conservative class has been steadily growing, and now contains quite a respectable number of the thinkers, or in other words, it contains the workers and reasoners, and not the enthusiasts.

The main reasons for this difference of opinion consists, firstly, in a faulty construction of the instrument; secondly, to a faulty use of it; and thirdly, a wrong interpretation as to what can be accomplished with it.

Glancing for a few moments at the different ophthalmometers, we have to consider first, the original instrument constructed by Helmholtz in 1853. This instrument is really perfect in construction giving us most accurately the radius of curvature at any part of the cornea desired. Its results are accurate, but its use entails the expenditure of a large amount of time:—to thoroughly measure the cornea at any point necessitates at least sixteen separate readings. It has been used by Knapp of New York, and Strawbridge, Wieland and others of Philadelphia. All testify to its accuracy and perfectness, but consider it more valuable in the laboratory than the office.

The ophthalmometer of LeRoy and Dubois has the disadvantage of being poorly constructed, the hinge and other joints being loose; in fact, nearly all the fittings are inaccurate. There is no means of steadying the head so that the eye may be fixed while being measured; the scale is inaccurate; the bar on which the mires or reflectors ride is straight, whereas, it should be an arc of a circle with a radius equal to the distance of the scale from the eye being examined. It has no means of artificial illumination, while requiring for its proper use a very strong light. Some pretend that by its use, the refraction of the eye-ball can be determined. The claim is, however, too absurd for discussion, as it must be evident that it is a physical impossibility to determine this objectively.

The Javal–Schiotz ophthalmometer of 1889, if mechanically well constructed, is a good instrument. Its most frequent defects are a displacement or a malposition of the Wollaston bi-refrangent prism: a displacement of the arc upon which the scale is constructed and the mires move; the want of a means of keeping the patient's head fixed while under examination, and an insufficient illumination.

In the Javal instrument (model 1889) of French construction, the base is too light; it does not keep the telescope and head-rest in a fixed relation to each other; and in the general workmanship, it is markedly inferior to that of American construction.

A malposition or displacement of the Wollaston prism is frequent. Instead of the primary image revolving about its centre with the revolution of the telescope, it has in addition, another motion about an imaginary centre, the secondary image in either case moving about the primary one. This double motion of the primary image is due to a faulty position of the prism, and before using such an instrument it should be carefully overhauled, as all results obtained under these conditions are absolutely worthless. If the arc be not in proper position—if it is not at all points exactly the same distance from the eye, again are the results valueless The screws by which the arc is fastened to the barrel of the instrument must be very carefully adjusted. In order to test the arc, a lens with a refractive power of its anterior surface of about 32 diopters should be placed at the rest of the instrument. If, as the telescope is revolved, there be the slightest break in the continuity of the black lines of the mires, it indicates that the arc is still improperly adjusted.

With a properly constructed instrument, a good illumination (four incandescent lights of sixteen candle power being undoubtedly the best), the apparatus firmly secured to a good stout table, and the patient's head firmly fixed (strapped in the head rest), the results will be trustworthy and accurate. It is for us to interpret the results.

Here let us pause and inquire as to what has been expected of the instrument, and how far our anticipations have been realized.

There are those who have assured me that it would measure the refraction in any meridian. It is with this idea in view that the scale of the LeRoy-Dubois instrument is constructed. Physically, as before mentioned, this is an impossibility and cannot be accomplished. Others consider that it will invariably give both the axis, and entire amount of astigmatism of the eye. This it will do only in such cases where the astigmatism is confined to the anterior surface of the cornea; but the astigmatism may not be confined to the cornea and therefore the lenticular astigmatism must be considered, as must also the fact that the posterior surface of the cornea may not be parallel with the anterior; if this be not so, it will influence the astigmatic refraction.

In other words, ophthalmometers deal with the cornea only, and are therefore strictly speaking, keratometers, and any knowledge of other parts of the eye-ball that they may reveal to us, is obtained by a comparison of our other studies with those of the keratometer.

In fact, all we obtain is a knowledge of the anterior surface of the cornea, its radii of refraction, its irregularities, and some idea of the transparency and nutrition of its superficial layers. When once this fact is thoroughly realized, there will be fewer disappointments, as well as fewer enthusiastic outbursts, than have up to this time characterized the progress of these studies.

By means of the keratometer we can measure the corneal area, its curvature at any or all parts, and learn the angle of the axes of the principal meridians at the part under examination, as well as the difference between the radii of curvature at these, or any intermediate, points; and can thus determine in diopters, the difference in corneal refraction at these points.

In addition to this, the instrument has in my hands, proven valuable in determining problems as to the nutrition of the cornea, and as to increase or decrease of the intra-ocular pressure.

My first keratometric work was done with a Helmholtz instrument, but I am now using the Javal instrument entirely, and with it have examined over eighteen hundred eyes of over nine hundred patients.

In all cases of refractive errors or diseases of the eye-ball or its appendages (with the exception of a few cases of acute inflammation of the iris, cornea, and conjunctiva) in addition to the routine examination, a keratometric examination is invariably made. Of these, over fourteen hundred eyes have been thoroughly examined and tested while under the influence of a mydriatic, either atropia or homatropia. As a result of these examinations, I have found that the axis of astigmatism as determined by the keratometer, corresponded to the axis as determined by the mydriatic in eighty-eight per cent. of the cases, while the degree corresponded (after making the correction of 0.37 diopters, subtracting it when the astigmatism is with the rule, and adding when against the rule) in forty-five per cent.

It is an admitted fact that the astigmatism of a ball is not always confined to the cornea: that not infrequently it is lenticular. Of this we have two varieties—the static, and the dynamic. In the dynamic variety, supposed by some to be a compensatory effort to overcome the effects of the corneal astigmatism, usually all that is necessary is to carefully correct the corneal astigmatism, the dynamic lenticular astigmatism disappearing. In the static variety, the ophthalmometer cannot give us the the total astigmatism In these cases we must proceed to the estimation and correction of the lenticular astigmatism as well. It is these cases that, in the whole range of refaction work, give us the least satisfactory results.

In the examination of corneæ which have been subjected to weakening of structure in consequence, either of local inflammations or systemic disorders—cases where the result obtained by glasses, while under mydriatic influence, are either indifferent or nil, because of irregularities in curvature or in the transparency of the corneal layers—we can often get very good results through the aid of the keratometer. By instilling a few drops of castor oil on such corneæ we are often enabled to get very clear images, and can thus determine the axes of the principal meridians and the difference in diopters between their refractive powers.

The approach, advance, and subsidence of glaucoma has been made more noticeable and marked by the changes in the axis and the curvature of the cornea, and changes in the brilliancy of the keratometric images, than by any other method of examination.

In developing myopia it will soon show the suspicious nature of the case, and in progressive malignant myopia, the changes are frequent and marked. I have often noticed that irritable retinæ are associated with corneas whose axes and curvature vary, and now I always seek for the latter whenever I find the former.

In corneal malnutrition, dependent upon syphilitic disease, the changing of the axes and curvatures, with a loss in the brilliancy of the reflex, precedes an inflammatory attack, and if this condition be appreciated serious results will often be avoided.

In refracting cases of aphakia and in refracting shortly after injuries of the cornea and after operations involving the cornea, its value must be evident to all, giving us results which often we could not obtain without incurring possible danger from irritation and subsequent inflammatory action.

Some of the intricate problems regarding the construction of the eye, its depth and diameters, its lens astigmatism and refraction, can be determined by means of calculations from the data as furnished by this instrument as compared with those as furnished by the subjective examination under full mydriasis.

Now briefly outlining, we find that the ophthalmometer will not give us the refraction, nor will it give us the total astigmatism except when this is confined to the cornea; or any knowledge as to whether there is or is not lenticular astigmatism. It will give us the axis and degree of astigmatism when this is corneal; practically we find that it gives us the axis in 88 per cent. and the amount of astigmatism in 45 per cent. It reveals to us a knowledge of diseased conditions of the eye-ball when the disease is of such nature as to interfere with the corneal nutrition or to increase or decrease the ocular tension. It will, in connection with other methods, allow us to calculate the lenticular refraction and astigmatism, as well as the depth of the eye-ball, and thus puts within our grasp a new method of the more thoroughly studying its function and anatomy.

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# HEMORRHAGIC GLAUCOMA—ITS NATURE, PROGNOSIS AND TREATMENT.*

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Case I:—Hemorrhagic Retinitis: Secondary Glaucoma: Iridectomy; Paracentisis and a second Iridectomy: Enucleation.

April 22, 1884, Mr. E. W. G., æt. 53, a tall, spare man, with iron gray hair and swarthy opaque skin, a merchant from the interior of Pennsylvania consulted me regarding the rapid and serious failure of vision in his right eye. His general health was much impaired which he ascribed to financial troubles followed by tedious litigation which had disturbed him very much and left him, according to his own statement, a nervous wreck. This had occurred eight years before, since which he had suffered more or less from impaired digestion and extreme nervousness, with spells of great mental depression. His hands and head were in a state of constant agitation as in progressive palsy. The reflexes were normal and he was free from pain. The urine was acid but exhibited no trace of albumin or sugar, but at intervals deposits copious quantities of red sand. The radials rolled rigidly under the finger but there was no gross lesion of the heart although he was readily winded on the slightest exertion. He had not suffered from what he recognized as gout or rheumatism.

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* Read in the Section of Ophthalmology, Pan-American Medical Congress, 1893.

O. D., V counting fingers at .50 m, T. n., no contraction of Field.

O. S. 3 D. V $\frac{6}{6}$ Tension and Field were normal.

The ophthalmoscope revealed in O. D. a plainly vascular iris, and small pupils; H. = 3. D., small, dark red optic nerve, with indistinct margins and scattered throughout the eye-ground were innumerable small hemorrhages, some of which were flame shaped with fimbriated extremities while many others were simply minute red points The arteries were small and exibited gray and ragged margins as far as they could be traced into the periphery of the eye ground. The light streak was for the most part absent. The veins were relativly large and full, their margins gray, and exibited the central light streak far more than the arteries. No aneurismal dilatations were noted.

O. S., H. = 3. D. The general condition of the eye-ground was much the same as in the right eye, but there were no hemorrhages and the disparity in the size of the arteries and veins was less marked. The pupils in both eyes were small and dilated only small medium under homatropine. The serious nature of his trouble was explained to him, and an unfavorable prognosis given. His daily life was carefully regulated, the diet restricted, exercise in the open air enjoined and he received potassium iodide in increasing doses. A saline water was to be taken in sufficient quantities to keep the bowels in a lax condition. In two days he returned much encouraged by the improvement in his general condition, and his vision had risen to $\frac{1}{24}$. There were no new hemorrhages and the eye-ground was less deeply red. The treatment was continued and he received in addition a weak solution of eserine sulphate to be instilled in each eye night and morning. In one month he had gained fifteen pounds in weight, but his vision had made no further improvement. The tension in the right eye was questionably increased but the hemorrhages had largely absorbed. The field of vision remained normal. He was then taking twenty grains of the potassium iodide three times daily and this together with the eserine was continued. One month later, on May 25th, the right eye became painful which he attributed to a severe cold he had taken. The eye was not red but subsequently became so: and the pain became so severe that he at once set out for the city. The eye was found a cinnabar red, the cornea steamy and insensitive and the ball stony hard. The pupil was small and fixed and the iris was plainly vascular. There was no change in the left eye. V. $\frac{6}{6}$.

A stronger solution of eserine was freely instilled and blood extracted from the temple. After the extraction of the blood, notwithstanding the free use of eserine the pupillary diameter promptly increased to 4 m. No view of the fundus was obtainable. The following day he reported great relief from the treatment, which lasted until after midnight when the pain returned with great violence. Blood was once more taken from the temple and iridectomy advised. This was promptly done; the operation, notwithstanding the shallow chamber, was fortunately smooth but the hemorrhage following the incision of the iris was profuse and persistent, so that in the end the eye was closed with the anterior chamber filled with blood. The wound healed promptly and the blood-clot slowly absorbed. The tension became normal once more and the pain was entirely relieved. In two weeks Mr. G. returned to his home with the eye quite free from pain but totally blind, notwithstanding which he was very thankful for the relief experienced and the once more rapid improvement in health which followed.

On the tenth day after his return home he suffered a severe attack of cholera morbus, with violent emesis and purging, which greatly weakened him. In twenty four hours after the attack the iridectomized eye became uncomfortable, the discomfort rapidly developing into severe, unendurable pain, which on the fourth day once more drove him to the city for relief. The eye once more presented the cinnabar injection, characteristic of the glaucomatous eye, was stony hard and the anterior chamber occupied with a large blood-clot He was suffering greatly and was completely broken in health Enucleation was pointed out as the only sure source of relief but to this he strenuously objected. Eserine and local depletion gave no relief and so paracentesis of the cornea was done affording instant freedom, except from a dull periorbital pain, the relief continuing for several days and T. + 1. In a week the symptoms were upon him again with a new clot in the anterior chamber. He still refused enucleation and with full understanding of the uncertainty of relief submitted to a second iridectomy, which was made below with a Graefe knife, resulting in a broad coloboma well placed. To my own surprise this also healed kindly, afforded complete relief for six days when he received a telegram announcing the death of a favorite grand-child which greatly depressed him The following day he had an attack of acute indigestion, which in turn was followed once more by increased redness of the eye, and pain. The tension which had been sub-normal after the second iridectomy, became too high but the ball not stony hard as before. The symptoms steadily increased in violence for several days but were relieved by the digestive derangement ending in a profuse diarrhea with many liquid stools. The relief was only transient however and after suffering several recurrences of pain, accompanied each time with fresh hemorrhage into the anterior chamber, he gave up the fight and submitted to enucleation on Aug. 9th., rather less than four months after he first noticed impairment of vision.

Mr. G. has been seen from time to time since 1884 but at no time were hemorrhages detected in the left eye, although he had frequent alarms by spells of imperfect vision. A letter dated July 17th. 1893, says: "My left eye has been good until last March, when the sight became very dim; could not read, but is now much better, can read with ease and comfort."

Case II. Hemorrhagic retinitis; secondary glaucoma; Iridectomy: Enucleation. Followed in six years by similar attack in other eye; iridectomy; total blindness.

On May 15., 1884, Mr. O. æt. 65, came to me bearing a note from his physician, Dr. A. G. B. Hinkle, stating that two months before he had had an attack of retinal apoplexy. His urine on several occasions had contained traces of albumin, but lately this had disappeared He had had several attacks of vertigo, but none within the past two weeks. His treatment had been antiphlogistic, with care as to his diet, rest, and iodide of patassium.

Mr. O. was actively engaged and much engrossed by the details of a large business, and lately had been much troubled over its uncertainties, and by the sudden and unaccountable disappearance of a son. He was about five feet six inches in height, entirely bald, weighed about two hundred and fifty pounds, had a florid face and, although an abstainer from alcoholic beverages, was extremely intemperate at the table, eating large quantities of richly prepared food. and not hesitating to wash his roast beef into his stomach with large quantities of milk. His temper was extremely aggressive. and his manner always that of command. His career had been one of many vicissitudes, he having been driven as a union man from one of the border states during the war, at the sacrifice of a large fortune, which at æt. 65 he was struggling with might and main to recover. In March 1884. after spending an entire morning in his counting room reading and answering letters, noticed on getting into the street that his vision was defective, and the following evening the sight in the right eye had sunk to the ability to tell light from darkness. He consulted an oculist who advised him of the apoplexy of his retina, and gave him unfavorable prognosis both as to vision and health. Under the wisely prescribed regimen, and the potassium iodide prescribed by his physcian, Dr. Hinkle, he had lost fourteen pounds weight.

O. D., no perception of light, ball stony hard, steamy and insensitive, deep ciliary injection, shallow anterior chamber, pupil 4 mm. There was profuse lachrymation, and the eye was kept closed as though from photophobia; violent pain in the eye and severe hemicrania. No view of fundus admissible.

O. S. white, free from pain, ant. cham. shallow, pupil small, T. ?., Hm. = 2 50 D., V. $\frac{6}{6}$. Optic nerve gray and at its upper part a few small reddish points, probably absorbing hemorrhages. The pupil was too small to permit of the satisfactory study of the mucula lutea. There was concentric narrowing of the field to 30°. There was periodically a profuse deposition of uric acid and he was subject to fits of despondency and irritability. The radials were rigid but no serious lesion of the circulation was discovered, other than that existing in the retina. The serious nature of his trouble and the threatened onset of disease in the left eye were pointed out. Locally eserine, and leeches to the temple were directed. Free purgation and a rigid diet list, with exercise in the open air and entire absence from business, or even moderate use of the left eye were insisted upon. Two days later the pain was less and the steamy condition of the cornea had diminished. Iridectomy was then made upward, a broad coloboma well back being secured notwithstanding the great difficulties presented by the shallow anterior chamber. The aqueous was allowed to escape slowly, but profuse hemorrhage followed the excision of the iris and the eye was bandaged with the anterior chamber filled with blood. The pain was at once relieved but two days later the lids were puffy, the blood-clot still present and the wound open. The eye recovered slowly with filtration cicatrix. There was no return of pain, but there were frequently recurring homorrhages in the anterior chamber, until Aug. 8th, two months after the iridectomy, when after consultation with a colleague, he consented to enucleation. He was urged to continue his general regimen as directed, under the care of his physician and disappeared from observation. In the left eye vision remained as at first, possibly with some improvement, but no change in the field and no new hemorrhages.

In June 1890, six years later, Mr. G. returned greatly alarmed over the diminished sight in the remaining eye. He had had repeated attacks of transient dimness of vision from which he would slowly recover, but the present attack was worse and persisted. He had no pain, with + 2.50 D, V. = $\frac{9}{18}$, Tn. (+?) pupil small, anterior chamber shallow, iris apparently healthy cornea and deeper media clear, F. norrowed concentrically to twenty degrees, and a notch out of the lower temporal field extending quite up to the fixation point. Pupil was too small to permit of satisfactory examination of the eye ground, so a drop of 4% solution of cocain was instilled. Dilation secured was but little. The fundus was found studded with numerous minute hemorrhages, the arteries small, veins only relatively large. a doubtful cupping of the nerve which is gray and obviously the subject of a slowly progressing atrophy. He was apprised of the fact that he had much cause for alarm, in the presence of the optic nerve atrophy, the retinal hemorrhages and his genera dyscrasia. The arterial sclerosis had evidently advanced during the intervening years, and he was subject to fits of indigestion if he did not exercise care in eating. The portentous character of these retinal leaks were explained as showing the condition of the general bloodvessel system, and warning him of the importance of moderate indulgence at the table and of a carefully regulated life. Blindness was pointed out as sooner or later inevitable, which he himself felt must be true after his experience with the other eye. Consultation was requested but this he refused. Potassium iodide was administered and the instillation of eserine resumed. In a week vision rose to $\frac{6}{9}$ and he said he could move about with less difficulty. The middle of July he went to the New England coast for the summer and was not seen again until September 20th. V. had fallen to $\frac{6}{19}$. Field as before. There were numerous flame-shaped hemorrhages with many red spots dotted over the fundus; he saw to get about with difficulty. His daughter related that he would pay no heed to his diet, was self-willed and in spite of remonstrance would drink glass after glass of milk with an otherwise full and rich meal. Even at the seaside had worked incessantly at his business by telegram, correspondance and otherwise. Consultation was again requested but declined. Under purging, eserine, rest and ascending doses of the iodide of potassium and corrossive sublimate his vision once more improved. Oct. 11th .V. $\frac{6}{9}$ and the hemorrhages were disappearing. His wife was then taken critically ill which quite unnerved him and his eye grew rapidly worse.

A pronounced glaucoma now supervened: ball stony hard. His wife died at this very critical juncture and after her burial the vision was found reduced to central vision and only the large letters on the test card could be made out by searching. at two or three feet. The pain not severe at first in his stunned condition, steadily grew worse. That blindness was inevitable was only too plain but at his request, and after carefully explaining that it was a forlorn hope, an iridectomy was successfully made upward securing a typical and well placed coloboma. There was much bleeding but the wound healed kindly and the tension was restored to normal or possibly subnormal. There was no return of pain but the eye remained red a long time and vision was slowly lost, probably from atrophy of the nerve or possibly from repeated hemorrhages in the bottom of the eye.

He was last seen in April 1891, then totally blind but free from pain, the eye nearly white and the tension slightly subnormal. He came to reproach me with having been the occasion of his blindness, after a consultation had with another surgeon in a distant city, whose views he must have misunderstood. I can scarcely think it possible that any experienced surgeon would ever say that an eye with hemorrhagic glaucoma had been lost through a colleagues neglect.

Case III. Hemorrhagic retinitis: secondary glaucoma; blindness.

Mrs. X., æt. 70, was brought by her son, a physician, for rapidly failing vision in both eyes. Vision had sunk to $\frac{6}{30}$ in O. D. and to counting fingers at 2′ in the left. She had no pain, but said her eyes were weak and had been failing her for a long time. The anterior perforating vessels were all dark colored and large, the caruncles were swollen. There is no note regarding the state of the pupils or anterior chamber. O. D. media were transparent and there were innumerable small hemorrhages dotted over the fundus. The nerve margins were veiled, no cupping, marked perivasculitis. O. S. spicules of opacity in periphery of lens; details of fundus blurred by state of vitreous, but here also marked perivasculitis. No cupping of nerve, hemorrhages in retina more numerous and larger, and involving macular region more seriously than in the right eye. There is no record of the field of vision. In both eyes the sclera was rigid.

The patient was a tall, spare woman, with dark opaque skin, iron gray hair. Her manner was one of anxiety and distrust. There were gouty concretions in her finger joints, and the hands were distorted. Says she has suffered much from rheumatism. Urine had high sp. gr. and trace of albumin.

Had been told her eye trouble was glaucoma and her son brought her for an iridectomy. He was disappointed when a grave prognosis was given both as to general health and the probable results of any local treatment.

Operation was advised against, and her general rigimen carefully directed; potassium iodide was perscribed internally and eserine locally, while complete rest of the eyes and life in the open air were enjoined. The son was not satisfied with this conservative advice and sought the opinion of an eminent colleague in Philadelpia, who also advised agaist operative procedure.

Still other opinions were sought until the desired advice was received and an iridectomy performed on the left eye after a very encouraging opinion had been given regarding the brilliancy of the results of an iridectomy in glaucoma.

The wound refused to heal, there was a succession of hemorrhages into the anterior chamber, each time attended with pain. In this condition my advice was sought again and the above history obtained, but I declined to direct them further as they were disposed to criticise the doctor adversely, who had probably mistook the nature of the case, not being able to study the eye ground as I could do a month earlier in its history, and during the hemorrhagic stage.

I am inclined to offer excuses for calling attention to the gloomy clinical picture presented by hemorrhagic glaucoma. I confess it would have been a more pleasing task to have invited the section to the consideration of some form of disease which experience has taught us to assail with some hope of a successful issue. The serious prognosis which must be given in this disease however makes it all the more important that ophthalmic surgeons should entertain more or less uniform views as to its essential gravity, and its relation to other forms of eye disease in which increased intraocular tension is a characteristic symptom.

Inspired by the brilliant results of surgical procedure in primary glaucoma, the surgeon who has been fortunate enough to escape experience with this, fortunately, somewhat rare disease, may be led into a too hopeful prognosis. It is important therefore that a line should be drawn, as definitely as may be, between hemorrhagic and primary glaucoma, since on the one side lies a hopeful prognosis, while on the other, both experience and pathology join hands to teach us the limits of our art.

My own interesting although forbidding experience with this disease, the serious nature of which I did not at first fully appreciate, has prompted to a more careful study of the disease, and to a comparison of my own experience with the published records. While this collective study has served to remove the tendency to self-reproach for the unfortunate outcome in the cases here reported, it is to be regretted that it has also failed to inspire with greater courage or added hopefulness should further responsibilities rise.*

*A comparatively rare affection.* There is cause for congratulation in the comparitive infrequency of the disease. In twenty-thousand eye patients, I have seen but four cases, and several of my colleagues with large experience report by letter that they have never met with a case. In four-hundred and sixty-four glaucomatous eyes reported by Knapp, but nine of them were classified as hemorrhagic, and Bourgon in his elaborated paper, places its occurance at one case in six thousand seven hundred and forty-one patients.

*Prognosis.* It presents however a most gloomy picture, since no matter what form of treatment is adopted after the glaucomatous stage of the disease is reached, it goes on to a fatal issue, so far as vision is concerned. Thus in twenty-four cases comprising twenty-eight eyes, all resulted in total loss of vision, and twenty-four of the eyes were subsequently excised. The cases referred to are one by Norris (Trans. Am. Oph. Soc. Vol. iv), one by Kollock (Trans. Am. Oph. Soc. Vol v), three by Randolph (Trans. Am. Oph. Soc. Am. Med. Assoc. 1891, p. 257), two by Nettleship (Trans. Oph. Soc. Vol. iv), and two by Valude and Dubief (Oph. Record, Vol. ii), in all of which effort had been made to save the eyes. Then one each by Pagenstecher and Deutschmann, two by Brailey and Edmunds, and two by Bourgon, and one each by Wadsworth and deSchweinitz, in which enucleation was performed primarily. Bourgon, however, in detailing the results of iridectomy in twenty-four cases, records sixteen failures and eleven enucleations. In reply to a private letter, Wadsworth reports one case in which both eyes with an interval of a few months were the subject of this disease; the first eye was primarily excised; the other had sclerotomy performed which gave only tempororary relief and was subsequently enucleated. Ayres also reported by letter two cases, one of which was enucleated after iridectomy had proved futile and deSchweinitz's two cases, one iridectomized and subsequently enucleated, and one primarily excised. In the three cases here reported from my own private practice, four eyes were involved all proving fatal to vision, notwithstanding general therapeutics and operative measures in all. Two of the balls were enucleated, and two passed from observation. It will be difficult to find a clinical picture with a darker background of prognosis, than is here presented by hemorrhagic glaucoma. The terse but unfavorable prognosis given in all our text books are too well known to require repetition. Schweiger, e. g., states the general sense of classified treatises on diseases of the eye in the following language: Hand book of Oph. page 52 "The results of iridectomy are generally unfavorable in those cases of secondary glaucoma which have developed after retinal hemorrhages. In such cases the vision is frequently greatly impaired by the hemorrhages, and is irrevocably lost by the glaucomatous disease. But if severe and continuous pain remains, which yields to no other treatment, nothing can be expected from iridectomy and it only remains to enucleate the eye."

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* The original plan of the present paper included a complete review of the literature, of hemorrhagic glaucoma. I am greatly indebted to Dr. A. G. Thompson, for his aid in collecting the published work, but the recent admirable paper of Bourgon (Annals d'Oculistique March, 1893) and the translation of the work of Valude and Dubief, by Hubbell (Oph. Record Vol. ii, April, 1893.), has rendered the republication unnecessary.

*Pathology.* A grave prognosis however was to have been anticipated from a study of the general and local pathological conditions present in most of the patients who are victims of this fell disease; so that indeed, not only is vision surely lost, but the general prognosis is scarcely less grave than the local. While comparitively few deaths have found their reports in ophthalmological literature it is nevertheless likely that in some cases, the subsequently fatal ending would be known only to the general physician The fact, patent to us all, that of the numerous cases of retinal hemorrhage we are called upon to treat, a very small number ever developed glaucoma, is in part at least accounted for by the fact that fatal apoplexies occur before the glaucoma has had time to develop, since it not infrequently happens that many months, and in some cases a year and even longer, may elapse between the occurence of the retinal hemorrhages and the onset of the glaucoma, in which time the fatal intra-cranial apoplexies may and do occur. In other cases the results of treatment and an inproved regimen may be effectual in restoring a more favorable state of health and by this means ward off both the glaucoma and the fatal apoplexy. That glaucoma does not follow most cases of retinal hemorrhage or comes on only after prolonged intervals, may be due in part to the fact that hemorrhages are more likely to occur at the beginning of the sclerosis of the vascular walls, as pointed out by Thoma, and quoted by Bull as follows: "In the beginning of the process there is a loss of elasticity of the vascular walls, shown in life by a soft, high pulse, and pulsation and tortuosity of the arteries, notably of the retina. At this stage there is the greatest danger of rupture of the arteries, later the vessels, by the reason of the deposit of connective tissue in the intima become firm and rigid."

As the constitutional conditions advance, upon which the retinal lesions depend, the general impairment of the nutrative processes increases, in the eye as elsewhere. Under the irritating presence of the hemorrhages in the retina and the disturbed nutrition of the eye-ball, brought about by interference in its circulation, and by the presence of exudates, we recognize those conditions which readily lead to a disturbance of secretion and impeded excretion, probably through pathological changes in the region of the canal of Schlemm, and in the posterior filtration channels. In the case reported by Norris (Trans. Am. Oph. Soc. page 476, Vol. iv.), there were hemorrhages in the sclerotic and in and around the canal of Schlemm.

Edmunds and Brailey (Royal Oph. Hos. Reports Vol. ix Page 380 ) point out that in pure glaucoma cases there is almost without exception a most imprtant change in some or all of the intra ocular blood-vessels. This consists in a great enlargement of their calibre, consequent on their dilataion and is accompanied in the majority of cases by a thinness of their walls due to actual atrophy, and these changes are characteristic of glaucoma. In seventeen cases of hemorrhagic glaucoma microscopically examined by Edmonds and Brailey (Loc. Cit.) these arterial changes were found in all but one.

In Randolphs case (Trans. Oph Sec. A.M. Med. Ass. 1891.) there was found hyaline degeneration of the muscular coat of the central artery and the veins of the chorioid enormously distended, while endarteritis was apparent in several of the smaller arteries.

Bernbacher and Czermak always found in glaucomatous eyes the products of inflammation along the intra-ocular veins and around of the veins of Schlemms canal.

Debrowolsky observed comparatively frequently perivasculitis.

Brailey (Loc. Cit) says while arterial hypertrophy may be associated with general disease as in Brights, Diabetes or Syphilis it may also be a purely local affection as in cases of glaucoma following injury where similar conditions of the blood-vessels were found.

It is obvious therefore that the onset of glaucoma in apoplectic retinitis is determined by purely local conditions, which in certain cases is favored by a rigid sclera, or by retino-chorioidal states brought about in hyperopic or astigmatic eyes, or by many other conceivable conditions, while in the absence of these favoring conditions the glaucoma may never occur or may supervene only after lapse of time, the irritating presence of the hemorrhages, and the advancing pathological state of the blood-vessels, steadily producing the local conditions shown to be characteristic of glaucoma In a word therefore we must regard the glaucomatous symptoms as secondary to the hemorrhages and more or less strictly dependant upon the accompanying local pathological states. The graver character of the glaucoma of the hemorrhagic variety seems to grow out of its association with systemic conditions of which it forms but a local expression.

Regarding the existance of general arterial disease many of the reports are silent. In my own cases they were all subject of general arterial sclerosis, and in many of the reported cases the existance of general vascular disease is either distinctly noted, or the existance of albuminuria, sciatica, as in Randolphs' case, or other symptoms of general disease were present which render the existence of arterial disease highly probable. In two of my own cases the gradual progress of the general vascular disease was observed as the years went by. Both of these patients were victims of lithæmia and suffered repeated, acute exacerbations of the accompanying digestive derangements, each time followed by an increase of the ocular symptoms. In Dr. Wadsworths case however he is careful to note the absence of any other than a local cause. The most recent and one of the most valuable contributions to the important role played by systemic disorders in causing ocular disease, is a paper by Dr. Bull read in July last before the American Oph. Soc. on "Gouty Retinitis, Chorio-Retinitis and Neuro-Retinitis." Although there was retinal hemorrhages in but one of the five cases upon which his paper is based, nevertheless, the eye ground changes described by him, are much the same as those observed in hemorrhagic retinitis, barring the presence the hemorrhages. This is especially true as regards the appearance of the blood-vessels, namely the white line along vessels, the result of perivasculitis, or sclerosis. The clinical facts connected with retinal hemorrhages therefore justify the ophthalmic surgeon in the gravity of the prognosis given to patients who come with these lesions. In the case reported by W. F. Norris, which I also saw throughout its course, death followed from apoplexy one year after the eye had been enucleated. Von Græfe, Rampoldi, Brailey and Edmunds, Hirshberg and others have observed cases of hemorrhagic glaucoma followed by symptoms of intra cranial hemorrhage with a fatal issue, and Dr. J. A. White kindly reports by letter, two cases of Hemorrhagic Glaucoma, both of which died from apoplexy. This he puts forward as suporting his view that the whole trouble is due to atheroma of the arteries. We therefore are justified, not only in giving a grave prognosis as to the loss of vision, but also as to a probable fatal issue.

In answer to a circular letter addressed to a few of my ophthalmological friends, I have received the following replies. Dr. J. L. Thompson writes: "I have met with many cases of this disease and in every instance have found that the glaucomatous symptoms were set up months, and in some instances as long as two years after the hemorrhages were first observed. I have watched these cases from time to time. some of them with marked impairment of vision, others with but slight, but without pain or increase of tension for from six months to two years but have eventually had to enucleate these eyes on account of the excessive pain. The long experience which has enabled me to watch these cases through all their phases has convinced me that hemorrhagic glaucoma is a secondary affection in at least the great majority of instances. Eserine sometimes helps them for a short time. Iridectomy or sclerotomy are certainly contraindicated, but the enucleation often has to be resorted to."

Dr. G. E. deSchweinitz writes: "It seems to me that the hemorrhagic glaucoma is always a secondary glaucoma, and no doubt, depends, in the first place, on the hemorrhagic retinitis which preccedes it, and in the second place, on the constitutional disturbance which determines the lesion in the retina. I have performed iridectomy on only one such case. Twenty four hours after the iridectomy, there was a fresh intra-ocular hemorrhage and a prolapse of the vitreous into the wound. Curiously enough after this abscisson of this prolapse, the wound healed nicely and the patient was relieved from pain, although the eye was sightless. It seems to me that Bourgon's conclusion is a good one, namely, that during the hemorrhagic period the general condition should be cared for and the ocular globe rendered as free from congestion as possible: during the period of confirmed glaucoma myotics are useful as well as moist heat. If surgical measures were called for, I would do either tapping of the vitreous or sclerotomy, but I would not perform iridectomy. I would do neither of these operations without previously obtaining the consent of the patient to perform enucleation if I failed, or if not enucleation one of its substitutes. In a second case, which which occured only a few weeks ago, remarkable relief followed general medication, such as I have indicated, and in addition, full doses of chloral, which I believe has some influence in lessening tension. In spite of this, however there was a fresh attack at the end of a month, and the eye was enucleated at the patients request, the eye being practically sightless. Microscopically the lesions were those of an exquisite example of hemorrhagic retinitis"

Dr. F C. Hotz, refers to a published case, (Oph. Record Vol. ii page 234.) and writes: "The affection I have no doubt begins in the retina; glaucoma symptoms, are secondary, and no kind of operation will save the eye."

Dr. O. F. Wadsworth, writes: "To obtain any definate idea of the etiology of hemorrhagic glaucoma it must be shown why in some eyes hemorrhage in the retina or vitreous is followed at greater or less interval by glaucomatous symptoms, in others not. In my opinion scarcely any approach has been made to the solution of this question. Probably the etiology is not always the same. Such a case as the following seems to preclude other than a local cause. A lady beyond middle life presented hemorrhages scattered all over the retina of the eye; in the course of the year, glaucoma and enucleation; some months later, sight of second eye lost with similar subjective symptoms; eventually glaucoma, sclerotomy, which helped for only a few days; enucleation. Careful examination failed to discover disease of any other organ The lady lived some twelve years from time of hemorrhage in the first eye and died of acute pneumonia. As to prognosis, it is generally fatal, not simply as to sight, that is as a rule practically gone before the glaucoma appears, but as to the existance of the organ. In rare cases, pain symptoms subside and do not recur; usually enucleation is necessary to free the patient from continued pain. Both iridectomy and sclerotomy have failed in my hands to relieve pain for more than a very brief time. Still if enucleation were especially repugnant to them. I should try sclerotomy, but with the distinct understanding, that it would probably have only a transitory effect."

Dr. Joseph A. White, writes:—"My opinion is, that the whole trouble is due to atheroma of the arteries Two of my cases of hemorrhagic glaucoma died of apoplexy, rather supporting the theory, because the eye and the brain are the places where the arteries are the most exposed, and liable to rupture."

Dr. S. C. Ayres, says:—"In relation to this disease I will say that I have been very fortunate in not meeting many such cases. The most striking case is that of a woman where the iridectomy was successfully done, and I was called to her in a few hours, suffering intense pain. On removing the bandage, I found the entire vitreous extruded and the globe partly filled with blood, I immediately enucleated the eye In another case the globe partily filled with blood after iridectomy and I think remained sensitive for a long time. In a severe case where the vision was lost or nearly so, I should recommend enucleation. The after results of operation are so unsatisfactory that enucleation is frequently necessary even after well executed iridectomy."

Dr. Swan M. Burnett, speaks of it as a truly, terrible disease and regards himself fortunate in having seen but two cases."

Dr. Leartus Conner: "I have never seen a case of hemorrhagic glaucoma in my own work, but have been led to regard the disease as primarily due to a degeneration of the blood-vessels."

Dr. Edward Jackson, reports two cases in which general therapeutic measures proved of value, but the ultimate results were not known. His feeling is against operation but would operate if desired, after full explanation of the prospects, and decides in favor of posterior sclerotomy, rather than iridectomy or anterior sclerotomy.

*Treatment.* The views which have been expressed regarding the nature of hemorrhagic glaucoma, together with the grave clinical picture which it presents, therefore fully justifies a serious prognosis. Not only as to the almost inevitable loss of vision and the sacrifice of the eye itself but also to the possible fatal issue

My own judgment and experience are fully in accord with the recommendation of Bourgon, (Loc Cit.) regarding the treatment of disease. Following his admirable clinical division we will discuss its treatment during the two characteristic periods it presents.

First, a hemorrhagic period.

Second, a period of confirmed glaucoma.

During the hemorrhagic period our care must first be devoted to the general condition of the patient and second: "to remove the congestion of the eye-ball" No scheme could be better than this as a working therapeutic basis.

Our only hope for the preservation of any vision must be based upon our efforts during the hemorrhagic stage of the disease. Having in mind the fact that majority of these cases are victims of general arterio-sclerosis and the diathesis which has produced this state of the general vascular tree, the therapeutic measures to be adopted, are such as are properly directed to the existing diathesis, whatever it may be, gout, rheumatism, syphilis, morbus brightii, diabetes, or chronic malarial disease, and the allied pathological states of the heart, liver, kidneys or spleen. To this end the patients daily life must be controled. The hours for rest and the amount and kind of exercise, and a carefully arranged diatary, are of great importance. Potassium iodide and bromide, or in some cases iodide of iron, corrosive sublimate in small, frequently repeated, and long continued doses, should be administered. In hemorrhagic retinitis with traces of albumin and granular or hyaline casts in the urine I usually employ the Basham's mixture with the corrosive sublimate added, and avoid the iodine salts. If the turgid state of the chorioidal circulation is marked, and headache a prominent systom I have for many years employed ergot often with much relief. If there is cause to expect the existance of malarial poisening, quinine should be givern either alone or with arsenic. In this connection the following case is of interest. A lady æt. 45, had recurring retinal hemorrhages extending over a year and a half with now and again, increase of tension and pain. The blood contained the corpuseles of Laveran, and she lived in malarial region. The increase tension and pain were relieved by eserine and local bleeding and she received quinine and arsenic internally, and was sent to the seashore. The retinal hemorrhages ceased to recur after six months and she returned to her home in October. In November following she was attacked with apoplexy in church and died in a few days. Just one year before, she had had pronounced chill the cold change of intermittent while sitting in the same seat. In this case the glaucoma was several times a threatening symptom, and it is fair to assume that therapeutic measures adopted for her relief were effective in warding it off.

The general therapeutic measures which have been suggested are fortunately also well calculated to relieve the intra-ocular condition. As we all know the iodine salts and the bromide of potassium or lithium and bichloride of mercury, are markedly beneficial in treating diseases of the chorioid and retina of the non-hemorrhagic as well as the hemorrhagic form. The value of ergot in these purely local affections is also well recognized; but in addition to these general measures certain local means are unquestionably of great value. In the first place absolute rest of both eyes is of great importance and to this end, where refraction errors exist, they should be carefully corrected so that even in moving about, all strain upon the fellow as well as the involved eye, is removed. *Plane* smoked glasses should be worn to protect from glares of light. Plane glasses are preferable for the reason that the coquilles are usually irregular concave cylinders and thus cause much irritating strain. Systematic local depletion is important. A single leech either to the temple or over the mastoid on alternate days. preferably before retiring at night. The local free use of a boric acid wash to which a very little cocain my be added, not more than half a grain to the ounce, used with an eye cup rather than a pipette, is a grateful application and removes the conjunctival iritation so often present. Even in the hemorrhagic stage of the disease I esteem weak solutions of the sulphate or salicylate of eserine, not more than one tenth of a grain to the ounce, instilled twice or thrice daily of much value. I have long held the opinion that eserine was valuable because of its stimulating action over the muscular coat of the vessels and I am gratified to note that this view is also suggested by Laqueur. Warm and moist applications favor congestion and should be forbidden.

Period of Confirmed Glaucoma.

Unfortunately the most painstaking and well directed treatment of hamorrhagic retinitis does not always prevent the onset of glaucoma and we are driven to a choice in the majority of cases between a primary enucleation of the eye and certian operative proceedures, performed not in the hope of restoring vision, for this is already hopelessly lost, but in the hope of saving the eye ball. We can readily believe that if general and local therapeutic means employed during the hemorrhagic stage have failed to ward off the attack, they will be of little avail, after the onset of glaucoma is well established. In fact the excruciating pain is rarely relieved except by surgical procedure. Strong solutions of eserine, frequently repeated, local bleeding, and *hot* applications to the ball sometimes give partial but only transient relief.

Stilling, (Arch. Oph. Vol. 16, page 445.) recommends the use of chloral as having the property of reducing the tension of the ball and deSchweinitz also recommends the drug for this purpose. The pain continueing we are driven to surgical effort.

The result of operative measures for the preservation of either vision or the eye-ball are extremely discouraging and as has already been pointed out in the great majority of cases fails to give permanent relief from pain. Nevertheless, in case *one* it gave marked relief, which might have endured but for the unfortunate attack of cholera morbus. In the second eye of case II, although blindness was not averted it nevertheless gave permanent relief from increased tension and pain and the eye ball was preserved. The same was true of one case each, reported by Ayres and deSchweinitz. In a few other cases the ball was retained, presumibly as the result of iridectomy. Notwitstanding this the concensus of opinion is opposed to iridectomy. On this point however there is a great diversity of opinion and I cannot entirely agree with the view of Bourgon that it should be vigrously proscribed. Paracentisis of the cornea in case *one* gave complete relief from pain which lasted several days and therefore commends itself as a simple measure for temporary relief until other and more radical means can be adopted. Sclerotomy at the rim of the anterior chamber seems on the whole to commend itself as superior to iridectomy, a fact to have been anticipated, having in mind the general vascular disease. After careful study, should future responsibilities arise, I should first of all do sclerotomy or paracentisis of the vitreous chamber and having by this means relieved the tension of the globe and possibly secured a deep anterior chamber, perform either a free anterior sclerotomy, or if the iris were moderately healthy, a broad iridectomy.

# THE TOTAL CORRECTION OF AMETROPIA.

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The object of this paper is chiefly twofold: to relate some personal observations in regard to the result of the full correction of errors of refraction, and to elicit discussion. Conversations with confrères, the perusal of text books and of papers, convince me that full correction is prescribed by a very small minority of ophthalmologists. Still it is noticeable, especially of late, that the number is gradually increasing. Because the manifest error only, or perchance also a very variable amount of the latent, is treated by a very large majority, must we conclude that they are necessarily pursuing a better method, or may we not think that they are possibly following in a conservative way, the great genius of the master Donders, and the line upon line and precept upon precept of the text-books written from his day to ours? It is admitted, partial correction frequently, if not commonly, involves the necessity of a change of the glasses from time to time, till full correction is attained. This appears to me to be an unnecessary expenditure of the time and the "*talents*" of the patient. And furthermore he will frequently prefer to bear the ills and glasses he has than to fly to others. With full correction we bestow in the shortest time the greatest good upon the greatest number. With this glass the ametropic eye is made to conform as nearly as possible to the emmetropic type; the too small images on the hyperope is increased and the too large image on the myope is decreased to the normal size; the vicious habit of the strained relations of excessive accommodation over convergence in hyperopia and of excessive convergence over accommodation in myopia is fully corrected, &c.

The claim of McNamara that the development of the hyperopic eye might be interfered with by the too constant use of glasses need not deter us. The claim is well confuted by Randall (Trans. Am. Oph. Soc. 1890) who had not seen a single instance of increase in the refraction of the eye, which could be regarded as healthy, among many thousand cases. To the scientific mind of Donders it seemed "rational to determine the total hyperopia and neutralize this entirely." In practice he seems to have abandoned the idea, because he saw that "the eye accommodated for too near a point, and thus the patient fall from accommodative into muscular asthenopia"

His directions are: "if we know Hm. and Hl. give glasses which neutralize Hm. and about ¼ of Hl. As Hm. increases strengthen the glasses."

My contention is that few patients when fully corrected, just after recovery from cycloplegia, do accommodate for too near a point, and that those who do are able in a very short time to relax all their accommodation for distant vision, and to use only the normal amount in near vision.

Landolt in prescribing a reading glass for H. practically deducts from the Hl. so much as represents ⅓ of the accommodation.

For example (p. 380), in a hyperope of 7 D. with an amplitude of accommodation of 9 D. he prescribes 4 D. for reading at 33 cm. (= 3 D.) In this case the accommodation is compelled to furnish 6 D. (⅔ of its total) of the 10 D. required to read at 33 cm. while the emmetrope with 9 D. accommodation would require only ⅓ (or 3 D.) of the accommodation.

If a hyperope can use ⅔ of the accommodation in reading, without asthenopia, it seems to us there would be few under the age of twenty to treat, for the accommodation is equal to 9 to 10 D. and the hyperopia rarely exceeds 3 D.

Many who, in prescribing, call upon the ciliary muscle of the hyperope to perform an abnormal amount of work assume it to be stronger than that of the emmetrope. "According to Iwanoff it is not stronger" (Landolt).

During the past five years I have had the courage of my convictions, and prescribed in hyperopia and hyperopic astigmatism, with few exceptions, full correction for reading and occasionally a reduction of 0.50 D. when the glasses were to be worn constantly. By full correction is meant a reduction of 0.25 D. representing about the amount of over correction in testing at twenty feet.

Very seldom has it been necessary to reduce the strength of the glasses. My remarks in this paper apply principally to hyperopia and hyperopic astigmatisms. Myopia and myopic astigmatism occur comparatively rarely especially when a mydriatic is used. In myopia I give full correction when vision and accommodation are about normal, and less than full for near vision when these conditions are not present, and it seems advisable not to exercise the accommodation or to diminish unnecessarily the size of the retinal image. When the gravity of the case required, and the patient consented, the testing was done under atropine, otherwise under the repeated use of homatropine chiefly in the form of discs of homatropine and cocaine āā gr. $\frac{1}{50}$. The testing was very carefully made with the direct ophthalmoscopic method, and the test lenses One point, which I have not seen mentioned may be referred to. A much better result is often secured by testing first with the cylinders and adding the sphericals, than after the usual reverse method.

The glasses accepted under a mydriatic were almost invariably prescribed, even if the glasses accepted after restoration of the accommodation differed from the former, and gave better vision at the time.

Doubtless a great amount of relief is being afforded by every degree of correction adopted, but so comparatively seldom can or will the result of treatment be ascertained that, without great effort, we may never have sufficient data by which to come to any positive conclusion as to the best method to adopt. In order to determine the result of prescribing fully correcting glasses, I addressed a circular letter to some three hundred patients, and for the purpose of this paper, lest it might be too voluminous, have selected at random and tabulated the answers of only twenty-five. In these cases the results may have been more or less favorable, than the average. The questions addressed were :

1. Have you worn the glasses constantly or for near work only?
2. Can you see at a distance as well with the glasses as without them : or better with them than without?
3. How long was it until you used the glasses with the greatest comfort?
4. Have the glasses relieved your eyes or head or general condition, partially or completely?
5. Make any additional remarks.

In one particular the answers may be deceptive. It is most common to have a patient say, that sight is not so good for distance with the glasses, when testing shows it to be in fact very much better.

The following cases may be summarized, even at the expense of the pleasure, their perusal in detail might afford.

Ages under ten, 1; from 10 to 20, 6; from 20 to 30, 7; from 30 to 41, 11; total, 25.

Refraction under mydriatic.

H. 1; Ash. Comp., 16; Asm. Comp., 4. As. mixed, 1; one eye Ash. and one As. mixed, 2; One eye H., and one As. mixed 1. Total 25 persons.

## ERROR OF REFRACTION.

H. = 0.25 in one eye: = 0.50 to 1.00 in 16 eyes: = 1.25 to to 1.75 in 8 eyes: = 2.50 to 5.50 in 10. Total = 35 eyes: or H. in 75%.

Myopia = 0.50 in 2 eyes: = 1.00 to 4.00 in three: = 5.00 to 7.00 in 3. Total = 8 eyes: or my. in 16%.

Astigmatism = 0.25 in 17 eyes: = 0.50 to 1.00 in 14: = 1.50 to 2 00 in 11: = 2 50 to 4.00 in 3. Total 45: or astigmatism in 90%.

The ratio of Hm. to Hl. is in eleven eyes from the age of 7 to 20, as 1 to 5.44: in 24 eyes from the age of 20 to 41, as 1 to 2.42.

## GLASSES PRESCRIBED.

Full correction of ametropia determined under mydriatic in twenty-one eyes:

| | | | | | |
|---|---|---|---|---|---|
| 0.25 | less | than | full in | 15 | eyes. |
| 0.50 | " | " | " | 8 | " |
| 1.00 | " | " | " | 2 | " |
| 1.25 | " | " | " | 2 | " |

Total, 48.

Or total correction in 70%.

Prescribed bifocal glasses in three cases.

Vision with the glasses accepted under cycloplegia, as compared with vision with these glasses reduced 0.25 when the accommodation was restored: Vision the same in 23 eyes or 75%. Less in accommodation in 8 eyes or 25%, the difference being usually one number. The vision of these latter usually improved when the glasses were worn for one to two weeks.

The time the glasses were worn, before the greatest benefit was secured,

Was one month in one of the patients.
" 1 to 4 weeks in 4 patients.
" 1 to 3 days in 4 patients.
Was immediate in 10 patients.
Total 19. Not reported 6 = 25.

SYMPTOMS COMPLAINED OF BEFORE TREATMENT.

Discomfort or pain in the eyes = 7
" " " head = 4
" " " eyes and head = 12
No discomfort = 2
Total. 25

Pain in the head in 64%, in the eyes in 76%.

RELIEF REPORTED BY PATIENTS.

The eyes completely relieved in 16 = 64%
" partially " " 8 = 32%
" not " " 1 = 4%
The head completely relieved in 9
" very much " " 1
" not " " 3
" partially " " 3
Not reported 9 = 25

Of cases reported the head was completely relieved in 56% and partially in 25%.

As to the eye muscles, although occasionally it is imperative that they be treated by reading or gymnastic prisms, or by tenotomy, it is my conviction that in not more than two per cent. of patients, will any treatment of the muscles be required except that afforded by the accurate and full correction of the refraction.

In conclusion, let me draw attention to the great difference in the quantity and kind of refraction, shown almost invariably under a mydriatic and under previous active accommodation up to the age of 45, and to the fact that just after recovery of accommodation, the refraction very nearly agrees, with that found under cycloplegia, a sufficient sermon from the text, use a mydriatic in testing the refraction of every patient up to the age of forty-five.

"The Venetian."

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*Continued from last issue, page 200.*

## TUBERCULOSIS OF THE LARYNX AND PHARYNX.

Dr. F. S. Crossfield, of Hartford, Conn., read a paper on this subject and gave the histories of two such cases coming under his observation. The first case was that of a young woman, aged 23 years, unmarried, employed in a silk mill. There was no family history of tuberculosis; her health and surroundings had always been good. In May, 1886, she had an attack of meningitis following an injury. From this she recovered perfectly. Three months afterwards she took a severe cold and from that time on her health failed. She complained of a constant burning sensation in the throat, with a desire to cough: no expectoration. Deglutition produced but slight discomfort. These symptoms increased until June, 1887, when she went to Vermont and remained there thirteen months. During her stay there her weight increased from 88 to 108 pounds, her throat symptoms disappeared and she returned home feeling perfectly well. She resumed her work in the silk mill and worked steadily for three yeaıs, when she had a recurrence of her throat trouble. She first came under Dr. Crossfield's observation in October, 1891. Her condition then was as follows: pale, emaciated, easily fatigued, no appetite, slight rise in temperature in the latter part of the day. Deglutition was painful and a troublesome cough interfered with sleep and with the taking of proper nourishment; muco-purulent expectoration. The voice was husky and at times lost. The lungs were repeatedly examined and were always found free from disease. The pharynx was reddened and covered with a thick, tenacious ropy mucous, streaked with blood. Underneath this several small ulcerations were noticed upon the posterior wall, hardly deeper than the mucous membrane. The larynx presented the same appearance, but without ulceration. The epiglottis and vocal cords were reddened and slightly edematous. The patient was placed upon a nutritious diet, and cod liver oil, iron and wine were administered. The local treatment consisted of thoroughly cleansing the surface, and afterwards applying a 25% lactic acid solution every second day. In three weeks the ulcerations had healed and the parts had assumed their natural color. The girl's condition improved and the case was considered one of simple catarrhal ulceration There was no suspicion of syphilis.

Four months later the patient's symptoms reappeared with increased intensity. She was pale, emaciated; she had night sweats and coughed constantly with profuse expectoration of mucus. The voice was entirely lost. Dysphagia was pronounced. The pharynx was one mass of ulceration from a point a little below the uvula down and into the larynx. The ulceration was shallow and covered with grayish tenacious mucus. The epiglottis was enlarged by infiltration to twice its normal size and ulcerated almost throughout its entire length The arytenoids were also infiltrated and ulcerated. The vocal cords were edematous The entire surface of the larynx and pharynx had a peculiar blanched appearance. Repeated explorations of the chest proved negative, but microscopical examination of the secretion from the pharynx now showed unmistakable signs of tuberculosis. Cod liver oil and iron were again administered, and inhalations of oxygen were frequently given. The surfaces were thoroughly cleansed and the ulcerations were curetted after applying a ten percent solution of cocain. Lactic acid, 50% first and afterwards undiluted, was rubbed into the surface. Improvement began immediately and the ulcers rapidly healed. At the same time the girl's general health improved. It is now a year since the cicatrization was completed and the patient continues well. The throat was recently examined and shows no traces of having been the seat of such widespread destruction. The case was an extremely interesting one, both because of its unusual progress, and because it was a case of primary tuberculosis of the larynx and pharynx.

The second case related by Dr. Crossfield was one of pulmonary tuberculosis, complicated by laryngeal and pharyngeal lesions, and by the appearance of tubercular ulcers and nodules within the nasal cavities. Under the application of strong solutions of lactic acid the throat symptoms rapidly improved, but the patient died from general tuberculosis.

Dr. D. B. Delavan said he considered lactic acid one of the most valuable remedies that has ever been presented to us in the treatment of this form of tuberculosis. He has seen marvellous results follow its employment in these cases. He also referred to Dr. Trudeau's experiments in the treatment of general tuberculosis by means of his modified tuberculin. In one case of advanced pulmonary tuberculosis, associated with severe ulceration and edema of the larynx, marked improvement in all the symptoms followed the injections of the tuberculin. In the tuberculin of both Koch and Hunter, the cultures are prepared under a high temperature, it occurred to Dr. Trudeau that the heat perhaps modified some of the valuable albuminous elements in the material, and consequently he prepared his at a cold temperature and thus, with certain other modifications, he obtained a form of lymph from the use of which he has thus far had excellent results.

Dr. C. C. Rice said he had been very much interested in listening to the histories of the almost unique cases narrated by Dr. Crossfield. He has never seen more than one case that could fairly be considered one of primary tuberculosis of the larynx or pharynx. He has employed lactic acid freely in cases of laryngeal tuberculosis, but has never seen such beneficial results follow its use as Dr. Crossfield described. The patients improved for a time, then the ulceration recurred and the final result was always unsatisfactory. Still, it is the best form of treatment we know of in these cases. Dr. Rice said he has lately been interested in trying a new method of cauterization in these laryngeal cases by means of electrolysis. Galvanism is used. The negative sponge is held in the hand and the positive copper electrode is applied to the larynx and a current of one or two cells gradually passed through. By this process it is hoped that the copper salt will be deposited at the seat of the ulceration. This process looks reasonable, but it is yet too early to speak positively regarding it

**A Happy and Prosperous New Year to all the Readers of**

THE

# OPHTHALMIC RECORD.

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### DISCUSSION OF DR. RISLEY'S PAPER ON

## HEMORRHAGIC GLAUCOMA.

[CONTINUED FROM PAGE 230.]

Dr. Chisolm said:

That our general experience fully sustains the opinion that hemorrhagic glaucoma is the most destructive of eye troubles and least amenable to surgical or medical treatment I agree. In my earliest career, when I attempted to allay the pain by iridectomy, I had the misfortune of inducing a rupture of retinal vessels and a destruction of the eye speedily by pan-ophthalmitis. In such cases I now shun operative procedure I have in the midst of the general fatality had one good result from iridectomy in hemorrhagic glaucoma. A gentleman aged 33, first consulted me in 1873. I found slight bending of vessels and a hemorrhage near the disc. He was myopic. I gave him strychnia $\frac{1}{20}$ gr. three times a day and used eserine (one grain to one ounce) morning and evening. From time to time I saw him. He did not live in Baltimore. The eserine kept the eye quiet and the strychnia was a good tonic. He kept up this treatment for two years. In the mean-time the hemorrhage had quite disappeared and vision had not materially deteriorated. He had $\frac{15}{200}$ and could be improved by glasses. He was becoming restless under the daily use of the medication and requested operation. He had been all his life a book-worm and had posted himself about his disease. He knew all that the books contained about the value of iridectomy, which he desired me to perform. The operation was satisfactory. In the course of time I adjusted glasses and lost sight of him. Three weeks since I received a letter from him with this statement: "I feel it my duty to state to you the result of your operation. The operated eye is now as servicable as it was when you operated on it, but the one not operated on, which was then the best, is now totally useless."

Dr. Wolfe:

I have listened with much pleasure to Dr. Risley's interesting paper. I was particularly pleased with the remarks referring to the etiology of hemorrhagic glaucoma, as they remind me that not all eye troubles are to be traced to errors of refraction. A considerable number of hemorrhagic, as well as the other forms of, glaucoma are caused by mental emotions. A widow who has suffered grief and anxiety in mourning her husband, a mother who has been crying for the loss of a child, a gentleman who has met with heavy losses in business—all mental distress may produce glaucoma in persons whose nervous and vascular system predispose them to eye affections. The urinary secretion should be attended to, as it quickly indicates mal-nutrition and derangement of the organism. In addition to uric acid we sometimes find some traces of sugar. With regard to the question of operative interference, I am guided by the physiognomy of the eye. With a moderate anterior chamber and the iris not quite atrophied, I perform a large iridectomy, not with any sanguin hope of saving vision, but to save enucleation which I very much dislike. I prefer in extreme cases, the puncture of the sclerotic and allowing the escape of a very little of the vitreous. Of course a great deal depends upon the stage when the case comes before us.

Dr. Hubbell :

Dr. Risley's paper has been to me a very interesting one, and his experience is another proof of the inefficiency of treatment to save vision and prevent suffering in hemorrhagic glaucoma. He has again demonstrated that the prognosis is unfavorable and the only means of relief is enucleation. I have had two cases, both occurring in the advanced stages of the disease, and the radical treatment was at once resorted to.

There appears to be little doubt as to the pathology of the disease being a general arterio-sclerosis in which the vessels of the eye participate. The histological studies of Valude, of Paris, which I had the pleasure of presenting to the English-speaking profession in a translation published recently in the *Ophthalmic Record*, together with those of others, seem to establish this fact. Yet I ask why it is that hemorrhagic glaucoma, as in Valude's cases, Dr. Risley's, my own and those of others, is so frequently monolateral ?

The case which the president of our section has cited seems to me not to belong to the class under discussion. We must distinguish between hemorrhagic glaucoma and ordinary glaucoma with accidental retinal hemorrhages, and between hemorrhagic glaucoma and hemorrhagic retinitis with, possibly, an incidental increase of tension. While we all have the highest regard for Dr. Chisolm's skill in diagnosis, yet is it not possible that his case was one of ordinary glaucoma with retinal hemorrhage, and not typical hemorrhagic glaucoma at all ? If it was not hemorrhagic glaucoma, proper, then it does not cast any doubt upon the position which I hold, viz., that this disease is fatal to vision, and that paliative and tentative treatment is of no avail.

Dr. Risely's closing :

I have been much interested in the case reported by Dr.

Chisolm. If we were to accept it as a case of hemorrhagic glaucoma, its history offers us an excellent demonstration of the fact, quoted in this paper from Thoma, that it was in the begining of the arterio-sclerosis that hemorrhages were more liable to occur; that as time goes on the vessel walls were strengthened by the connective tissue produced in the retina. The operation was performed long after the hemorrhages were first noted, and during this time this strengthening of the blood-vessels may have taken place, thus affording an admirable illustration of natures conservatism. Certainly the hemorrhages had ceased at the time of the operation. Since, however, when first seen the case was regarded as one of *glaucoma with hemorrhages* and not apoplectic retinitis, I fear it could not be included in the group under discussion. Much as I would welcome even one case of cure of hemorrhagic glaucoma, certainly cured by any means, I think that Dr. Chisolm's case must be placed in a group with primary glaucoma.

I was glad to hear Dr. Wolfe's remarks regarding the important effect of the emotions, grief and disappointment particulary, in the etiology of glaucoma. This was especially demonstrated in the cases reported. I felt however that this result was produced by the disturbance of nutrition under the depressing influence of grief. All were familiar with attacks of jaundice and digestive derangements, consequent upon these depressing influences. In a word the blood-stream became loaded with poisonous products, which in time set up or aggravate the intra-ocular conditions, characteristic of glaucoma, especially in eyes where glaucoma was imminent.

In reply to Dr. Hubbell, I would say that the disease was by no means a monocular disease. In the twenty cases collected in the paper, in four of them or 20%, the disease was binocular.

# THE ETIOLOGY AND EARLY MANAGEMENT OF GLAUCOMA.*

By G. EDGAR DEAN, M.D.,
Oculist to Lackawanna Hospital,
Scranton, Pa.

Although much attention has been given by authors to the subject of glaucoma, a great deal of the mysticism of the past has clung to it, causing most observers to class it with the inscrutable; while the few ventured to explain it by fine-spun theories.

Believing that the theories of the causation of this important disease of the eye which I learned from the text-books of a dozen years ago or more and that which I heard taught in Vienna in 1887, must, from their very nature, be nothing better than fragmentary, I have been making some observations independent of theory, either dignified by age or newly preconceived.

If the conclusions arrived at should—as I venture to hope—throw some light upon the etiology of the disease, give definite aim to the labors of the pathologist, and lead up to a more rational plan of prophylaxis or treatment than has prevailed in the past, I shall feel more than repaid for the effort expended in the researches.

My first observation was that the theory given in the excellent treatise of Sœlberg Wells—mostly quoted from Græfe, and which we may call the anterior inflammation theory—however attenuated, would not apply to all cases; and was therefore untenable as a general theory.

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* Read in the Section of Ophthalmology, Pan-American Congress, Washington, D. C., 1893.

My next observation was that the theory taught us in the clinic of the celebrated Prof. Stellwag, by his first assistant, and which we shall call the choroiditis theory, while approaching a little nearer the bottom facts, did not at all cover the ground. it being evident that while degenerative choroiditis might be present, in a good many cases it was as likely to be a *part* of the pathological process as to maintain the higher relationship of cause to effect.

Then I observed year after year, that—with few exceptions—the cases of decided glaucoma, of threatened glaucoma and of glaucomatous cupping without active symptoms, were in persons affected with astigmatism (frequently conjoined with hypermetropia): and it seemed to matter little how small the degree, 0.25 of a dioptre being a not infrequent showing.

Later I began to observe that the exceptional cases were myopes in whom a more or less similar condition of back-pressure existed; or what is relatively the same, posterior weakness of the eye-ball.

My next investigations led me into a study of the so-called "physiological cupping," and I found it such an elusive subject that I at last concluded that it was to a very considerable extent a *delusive* one. Perhaps the fairest explanation of it in all respects that can be given in brief, is to compare the whole subject with the inguinal canal in its healthy state, and its possibility of acquiring inguinal hernia. The conditions are analogous in the main, except as to size and the possible difference in time required to produce a similar effect from a similar cause.

In both instances we have a point of weakness about certain vessels and subjected to more or less pressure from within. In each we may have this weakness exaggerated—it may be anywhere from a slight to an extensive degree—by a funnel-shaped depression or cupping outwards which may be either congenital or produced. It is easy to understand that a tolerably constant undue pressure may gradually increase the depth of this cup or broaden it, and thereby gradually increase the element of weakness: or it may yield suddenly at the base and admit of a hernia *de facto*.

In the case of the optic disc, we have in perfect health, as it appears, an exceedingly slight depression about the *vena centralis retinæ*, and also some less rigid tissue there, apparently intended by nature to afford greater safety to the vein Now in the highest state of nature, this slight depression has an area of elevation around it which acts as an excellent bulwark of protection: but let it be subjected to a continued excess of pressure, slight though the accretion may be, as in the eye-strain of defective refraction, and we may observe that the interfibrillar substance of the nerve is absorbed, leaving a broad shallow cup (the atrophic cup of Fuchs); or, apparently independent of that, we may notice in other cases quite deep retrocession at the temporal side of the central vein without any very noticable lowering of the general surface of the optic disc. In the former cases (atrophic) there is apt to be also atrophic change at the periphery of the disc, while in the latter cases this factor is at least not so noticeable.

I am disposed to regard both these conditions as intermediate stages between a healthy condition of the nerve on the one hand and glaucoma on the other; more especially as I have seen inflammatory glaucoma in an eye with one of the deep narrow cups and a decided tendency towards glaucoma simplex in another, and because it appears that atrophy of this kind favors the developing of glaucomatous cupping. The optic nerve is placed very much like the cork in a wine bottle, i. e., as if forced in, so that outwards and inwards it is larger than in the middle; hence an atrophy which reduces its diameter tends to make it *push out* more readily, thus displacing the lamina cribrosa backwards and admitting of the well-marked glaucomatous cupping.

Having given a brief *resume* of the course of utterly unbiased reasoning which led up to the conclusion, though without introducing the cases, which would be interesting enough if time permitted, we shall unhesitatingly announce the prime underlying cause of the disease

The key-note of glaucoma is eye-strain; and that usually from some defect of refraction.

There is no need to make a great mystery out of glaucoma any longer. If it were possible to correct all the errors of refraction in a given community, correct them early and keep them continually corrected by suitable and absolutely accurate glasses, then in that community, glaucoma apart from a few secondary and traumatic cases, would disappear. We speak advisedly in saying a few, for it is highly probable that these cases have largely been predisposed to by eye-strain. We apprehend that the elucidation of this subject has been delayed somewhat through reverence for the opinions of the immortal Graefe. It is indeed a high tribute to his genius that his doctrine on the subject should have been accepted as the law governing research almost up to the present time. Graefe did wonderfully well—as well as it was possible to do in his day; but the age is progressive and the greatly improved refraction work, at least of some of the more careful men in this country, makes it possible to take a deeper and more comprehensive view into the etiology of this and certain other diseased conditions of the eye.

Our object should not be to combat the theory of this or that individual, but to lay a foundation under them. Some of them at least, and perhaps most of them, contian good material and make such a presentable showing that they deserve to have something better than mist to stand upon.

While we have already been laying considerable stress upon back pressure, and while we believe that in the average case the posterior portion of the eye earlier receives the impression which tends in the direction of glaucoma, we must never lose sight of the general truth that eye-strain, the cause, is bi-polar in its action: hence we must comprehend the effects produced both posteriorly and anteriorly, and must not be surprised nor disconcerted by the variations in type met with in studying the disease. It is but natural that when a force acts in more directions than one, the manifestations produced may vary in character. Of course in speaking of posterior strain, we are referring to that which takes place in and about the optic disc; and of anterior strain, referring to that which occurs in and about the ciliary region, including a tolerably large and important area.

We further must not ignore the fact that there is lateral pressure as well, and that the *venae vorticosae* are important elements in the circulation of the eye And perhaps there has not enough stress been laid upon the ease with which the retro-choroidal lymph space may become affected.

Concerning the effects of anterior pressure, it is not necessary to say much here, for the reason that it is so well described in the text books. Most of them doubtless attribute undue importance to disturbances in Schlemm's Canal, as etiological factors; they are important enough to be sure, but it should be borne in mind that there are other and larger lymph channels in the eye. A close observer may notice that in a great many cases, interference with filtration in that direction is the final act of a rather long ocular tragedy.

A strong argument that the early pressure effects are not so much forwards as backwards, is that so little scleral congestion is observable in the inflammatory cases compared to what is seen in iritis, cyclitis, etc.

No wonder the scientist looked in vain for the cause *during* the attack, when the cause has been acting more or less quietly for years until the attack obscured it, and rendered critical study impossible.

It should be remembered that in thousands of non-glaucomatous cases the same cause (eye-strain) is acting, but finds enough resistance to prevent a glaucomatous effect from being produced.

The optic nerve often withstands the strain so long and with so little local deleterious effect that we can but marvel at its power of endurance. And even when some retrocession has occurred, oftentimes no startling symptoms arise until the lamina cribrosa has been forced back to such an extent that the pressure in part is applied in a lateral direction almost directly upon the nerve sheath, upon the lymph channel surrounding it and, somewhat less directly, upon the posterior ciliary circulation.

Likewise forward pressure in the ciliary region (i. e., practically in the opposite pole) is endured fairly well until it causes an impingement upon the absorbent angle of the anterior chamber.

But it will be observed that these are only climaxes in a process long since begun.

It is highly probable also that in a considerable percentage of cases, strain at one pole is endured until too much strain is applied at the opposite pole ; then the patient, suffering eye succumbs to overwhelming forces. In another of the diseases to which flesh is heir, viz., peritonitis, we have what may answer as an example in some respects of what is meant. So long as a peritonitis (non purulent) remains localized, it may seem comparatively insignificant, but let it assume a general form and all will admit its gravity.

Space will not here admit of going exhaustively into the subject of eye-strain, but a few points may be briefly touched upon. We shall premise by saying that the term has too often been restricted in many minds, almost entirely to the apparatus of accommodation, rather ignoring the important part played by the recti muscles.

It is true that, apart from myopic eyes, a large percentage of the strain comes from near work, and hence glaucoma, as a fully developed disease, is largely confined to persons of more or less mature years, when the eyes find some added resistance to the efforts of accommodation. It accounts also for its relatively greater frequency in hypermetropes. We should not be surprised to find, if sufficient statistics were available, that the average onset was a little earlier in hypermetropes than in some other classes of cases, just as we notice in them the relatively earlier necessity of wearing glasses for reading.

A very possible reason why myopic eyes are less frequently glaucomatous arises from the fact that many of them do not find much difficulty of accommodation. Another factor is found in the *general* weakness of the posterior wall of the globe, making the excess of pressure relatively less felt at the disc than in hypermetropic cases.

Understanding that astigmatism is one of the greatest causes of eye-strain, we must consider that the ideal eye for the production of glaucoma, would be one with hypermetropic astigmatism.

It is known to be rather frequent in such eyes, and doubtless a great many glaucomatous eyes classed simply as hypermetropic, really had a slight astigmatism which was undiscovered.

Statistics show that very few emmetropic eyes have been affected with glaucoma, so few indeed that it is exceedingly probable that they were cases of mistaken diagnosis.

If space permitted, we would refer to general conditions of the circulation and the system at large: to tonic spasm of the cilliary muscle, intra-nasal pressure, etc., as possible etiological factors. For the reason indicated, it is impossible here to give a detailed explanation of our views regarding the mechanism of eye-strain.

If the pathologist will take his cue from the clinical facts that eye-strain is the general underlying cause of glaucoma, and, further, that the earlier effects, so far as tending towards glaucoma are concerned, may be exerted backwards quite as frequently as forwards—perhaps far more frequently—,he will soon find that the study of this disease does not lead him into such a mystical field as it has been pronounced by most of our authors.

If then he will turn his attention to the admirable schematic cut in Fuschs' "Text-book of Ophthalmology" (page 251) showing the lymph passages of the eye, and, observing how extensive they are, decide to make a *general* study of them in connection with glaucoma, he may find a rich field for investigation, and produce some decidedly definite results.

## EARLY MANAGEMENT OF GLAUCOMA.

It has been thought best to refer to the plan of treatment provisionally adopted as the "early management of Glaucoma" for the reason that it applies primarily to those cases of Glaucoma and threatened Glaucoma, which early come under the observation of the oculist; and it would be manifestly unfair to apply it only to a few neglected and desperate cases found in metropolitan hospital practice, and then reject it as unworthy.

Of course, in this disease even more than most others, prevention is better than cure. The chief measure of prophylaxis is the early use of acurate glasses; but medication is also useful in that direction. The medication must, however, be followed up by glasses, and no pains must be spared to make them exact.

Of therapeutic measures perhaps the best we have as yet found are acetanalid internally, pilocarpine solution instilled into the eye, and the hot solution of boracic scid applied externally.

The acetanalid has mostly been given in eight grain doses, three or more times a day to the average adult, and four grain doses to specially susceptible females. Its action should be watched so that it shall not cause too great depression; and if the temperature is found sub-normal, the dose should be lessened.

My reasons for preferring pilocarpine to eserine are two-fold: first, that while it may not be so strong a myotic, it seems to have a better effect in reducing cilliary congestion; secondly, it allays pain instead of causing it, as eserine does.

We know of no reason why the strength of the solution should not be increased in critical cases, but 4 gr. ad ℥i is as strong as we have used. Whether the salicylate of sodium does good of itself, we cannot say positively, but at any rate it preserves the solution, and we have sometimes fancied that the pilocarpine solution was more efficacious when combined with it. So we invaribly use it at the rate of ten grains to the fluid ounce.

Very possibly it may be found that hypodermic injections of pilocarpine ($\frac{1}{6}$ gr.) may be of service, but I have thus far never used them in this connection, preferring to rely upon acetanalid as internal treatment. Unless the patient were kept in a recumbent position and the circulation and temperature noted, it would not be safe to make use of both these depressing agents at once. Perhaps we may find cases wherein this, as in so many other diseases, the recumbent position is highly advisable: but oftentimes the pain is of such a character as to make the patient restless instead of causing him to seek repose.

For the hot external applications the patient was allowed to make an extemporaneous solution of boracic acid; but the mode of applying was as specific as possible. They were made with soft cloth dipped frequently (once a minute), kept at about the highest comfortable temperature, and continued twenty minutes each time. The frequency of repeating them varied with the case from once a day to every three hours or oftener.

We had hoped to obtain favorable results from the use of gelsemium, but, at least in the dose employed, it did not yield as favorable results as acetanalid.

The early employment of *temporary* glasses is a measure not to be neglected in certain cases: for in these irritable eyes a sensible man will not attempt a great amount of subjective testing for glasses; and we doubt if many cases retain the same refraction when the acute and sub-acute symptoms have passed, that existed during those stages.

Regarding iridectomy in this disease, we are confident that it is an operation which will fall more and more into disuse. It was an empirical operation at best, and though it served a very useful purpose in its day, it has comparatively little place in attending to the better cared-for eyes of the present. While it may still remain a desirable procedure for urgent or neglected cases, it does not always produce satisfactory results, and should by no means be lightly adopted as routine practice.

## DISCUSSION.

Dr. S. S. Koser:

I am loath to believe that these cases come to us sufficiently early to make out with exactness these low grades of refraction. Certainly this is true of those who come to me. And as to therapeutic management I have not seen much success therefrom. On the contrary, rather let us operate early while it is yet possible to do an iridectomy neatly, than wait until the iris is so degenerated that an equally clean operation cannot be done.

Dr. McFarland:

I am delighted to know that some one has had such universal good fortune following operations for glaucoma. It has not been my fortune, nor the fortune of those with whom I have been most familiar, except in acute or subacute forms of the disease. I would refer to the report of a group of cases of Dr.

C. S. Bull, of New York, in which the results were far from satisfactory.

I think medication valuable as well as iridectomy which cannot be discarded.

Dr. Tiffany:

In my first years of practice in Kansas City, I had frequent cases of acute glaucoma; of later years they have been less frequent. I attribute this to the fact that the cause has been largely removed by the universal correction of low forms of ametropia, and of hyperopic astigmatism in particular.

Dr. Tyner:

I have my doubts as to the existence of chronic glaucoma. As to eye strain, they rarely ever come to us in time for correction. Most of my cases have been in persons who were poor and did not use their accommodation. If timely made, iridectomy is mostly successful I am sure.

Dr. Redmond:

I speak more through observation here and abroad, as these cases are not by any means common yet, in my experience. I have found that surgical interference is almost always necessary. Cases in which I have seen iridectomy fail have been generally attributed to corneal incision instead of scleral.

Dr. J. W. C. Love, of Mexico:

My experience is that glaucoma can be relieved and sometimes cured by iridectomy; and of course treating whatever constitutional diseases may be found present. Eserine with hot applications (hot wet cloths) is my practice and I cannot give up this treatment until we have something better demonstrated.

Dr. Alt:

Dr. Dean claims that eye-strain is the cause of glaucoma. If it was the only cause, a great many more people should have glaucoma. There must be something else behind the eye-strain which even this paper on the etiology of glaucoma does not clear up and for which no theory has yet fully accounted.

Dr. Baker:

The last case but one in which I operated upon for glaucoma was in an old lady, seventy-four years of age. If glaucoma is due to eye-strain, as stated by the essayist, how would you explain it in such a case as this?

Dr. Savage:

To Dr. Baker's question: In the old there is no ciliary strain: but strain of the recti or obliques can exist at 120 or any age. Such strain begins in infancy and ends only with death, or blindness of one or both eyes, unless relieved by treatment.

Dr. J. J. Chisolm:

While an iridectomy is the only reliable treatment for glaucoma, especially the acute forms, I have sometimes derived such excellent results from eserine, as to do away in some instances with the need of the operation Only to-day I saw a case in a gentleman whom I had first seen in August, fifteen days since. He was 62 years of age and had been suffering intensely for ten days with inflammatory glaucoma in the left eye. The eye was much injected, pupil enlarged, anterior chamber obliterated, tension marked and sight reduced to counting fingers. The cornea was too steamy to give the fundus definition with the ophthalmoscope. He had walked the floor all night from severe pain. I determined to prepare the eye for operation by trying to establish an anterior chamber by use of a one grain solution of eserine instilled upon the cornea six times a day, and advised the use of the Japanese hot box for dry heat. The temperature of about 115 degrees was kept up for two hours at a time and was ordered three times a day.

The heat relieved the pain and by the next day I found the pupil contracting. The eye steadily improved until, at the end of a week, all congestion had disappeared, and with it all pain. Sight had returned as the congestion subsided and to day when I saw him, there was no need for an operation at present. Sight is normal, congestion all gone, and with the exception of a much contracted pupil the eye looks quite as well as the other which was not affected. How soon there may be a repitition of the glaucomatous attacks in this individual case I am not able to say. I have other cases of two years' standing that I have relieved as promptly as in this instance, and they remain cured.

I am beginning to have so much confidence in the eserine and dry heat for the relief of acute glaucomatous attacks that I am quite ready to advise this treatment as a preparation for an iridectomy should the relief not come in a few days' use of the remedies. For convenience, cleanliness and the very great advantages of keeping up the same temperature, I would call the attention of the Section especially to the Japanese hot box, which is in universal use in Japan to relieve pain in all cases in which we apply moist heat. They can be found at all stores selling Japanese goods. The Boxes as we find them, not made for eye work, are about the size of the hand, length, breadth and thickness. A charcoal fuse is used for heating Under the slow combustion of the box, it will burn for about two hours and will keep up a temperature of from 115° to 120°. I have had them in general use, both at my hospital and in private practice. for fully three years, and I know no substitute for it in any case of severe eye congestion, especially in glaucoma. Patients who have once used it fly to it for relief with confidence whenever the pain recurs.

Dr. Wolfe, of Scotland:

I have been trying to recall to my recollection the number of glaucomatous cases which have come under my observation, and to how many I could assign the uncorrected errors of refraction as causations. I may say generally that a considerable number had hypermetropia with a low degree of astigmatism. Some had simple myopia of 5 or 6 D., but in some the refraction (in the healthy eye) was normal.

With regard to the treatment: I consider absolute rest to the eyes necessary. All local treatment by eserine, pilocarpine and dry heat can serve only as a temporary palliate. I watch it for a very short time and as soon as unfavorable symptoms recur I proceed to iridectomy, which, in simple acute glaucoma, is the best means at our disposal. In cases, when under peculiar circumstances, iridectomy is impracticable, a parancentesis can be resorted to as a temporary palliative, which I think will be found more useful than medication.

Dr. Dean Closing:

I am very glad that so much discussion has been elicted, and it was not to be expected that so learned a group of scientific gentlemen would accept all the ideas advanced unchallenged; it is not in the nature of things.

My object was to start up trains of thought that might lead to useful results. My leading idea was to explain the *underlying or predisposing cause* of glaucoma; *not* to combat the operation of iridectomy as such. I believe in iridectomy in suitable cases where the rapid reduction of tension is an urgent necessity. What I meant was that by beginning early with suspicious cases its application might be gradually circumscribed. I also ventured the prediction that it would be less often required in private practice as the people learned to take earlier and better care of their eyes: aided by the pains-taking efforts of skilled oculists.

NOTE—(NOT READ AT WASHINGTON).

For valuable aid in the preliminary work of this paper, I am indebted to my friends Dr. C. E. Conner, of Scranton, and Dr. W. A. Shoemaker, of the New York Eye and Ear Hospital.

As intimated in the closing remarks, the clause in my paper refering to iridectomy was made more as a prophecy for the future than a statement of present practice.

The operation *is* at present more or less "an empirical one", but I trust that it will one day become a truly scientific one, confined within its proper limits.

Let him who would criticise the statements I have made first study his suspicious cases in the region of the optic disc with a Morton's ophthalmoscope; for I doubt if this paper would have been written had I not been the possessor of that admirable instrument.

## The Scientific Proceedings of the Section of Ophthalmology of the American Medical Association, at the Milwaukee Meeting, June, 1893.

ABSTRACTS OF PAPERS, DISCUSSIONS IN FULL.

CONTINUED FROM PAGE 196

### ORBITAL AND OCULAR GROWTHS.

By J. A. WHITE, M. D., Richmond, Va.

To the cases reported last year I add two more. The first case is one of post-ocular fibro-sarcoma in an old woman, age 24. At first she was treated by her physician for neuralgia. The patient grew worse and thinking he possibly had a case of gumma he put her on the iodide of potash, but with no relief. The eye becoming prominent and showing signs of inflammation the Doctor sent her to me. When I saw her the lid could hardly be closed over the protruding eye, although she could see fairly well. I attempted to remove the growth with the view of saving the eye, but found that I could not do this so I removed both the eye and the tumor. Microscopical examination showed the tumor to be a fibro-sarcoma. Case 2. Melanotic sarcoma of the choroid. When I saw the patient she was blind in the affected eye and disfigured by a large black growth, and was suffering from constant pain. A microscopical examination showed this tumor to be as named above. A recurrence will probably take place in both of the cases though this is not certain. Case 1 reported last year has had no return. Case 2 came back to the clinic showing a return of the tumor.

# ARTIFICIAL RIPENING OF IMMATURE CATARACT.

By B. BETTMAN, M.D.,

Chicago, Ill.

This paper consisted largely in showing that extraction of immature cataracts does not preclude the usefulness of direct trituration, simply because I triturate such cases which are not even sufficiently advanced to tempt the most daring operator of unripe cataracts. I also refer to experiments made on the eyes of young rabbits. *Severe* pressure (massage), such as I would never attempt in the human eye, on the lens with a spatula, never called forth the slightest reaction, showing that danger of rupture of capsule or suspensory ligament as the result of my operation never exists in rabbits. Cloudiness of the lens more or less dense was set up in every case. I report 3 cases where direct trituration was done at an early stage of the cataract. The cataracts were mature 3 weeks later, when I did the subsequent extraction with excellent results in all cases.

## DISCUSSIONS.

Dr. Murrell's question:

How long do you triturate the lens and about how much pressure do you use?

Ans. I have explained the method several times and that is why I did not refer to it in my paper. I simply make an incision into the cornea with a keratome, then pass the proper instrument into the aqueous chamber and make light pressure on the lens, rubbing it up and down and from side to side for a short time only. From 6 to 12 passes with the spatula will answer.

Dr. J. L. Thompson's question :

Do you use a midriatic before making the operation of ripening?

Ans. I usually use cocaine.

Dr. Ziegler :

I have performed direct massage of the lens for artificial repening of cataract in two cases that I can recall, and with excellent results. There was no reaction. The eyes healed in three or four days. The cataract matured in about two weeks. One was extracted safely at the end of six weeks, and the other in six months. The method I followed however was that known as Förster's, in which I did a preliminary iridectomy, although I introduced the shell spatula through the incision, into the anterior chamber, and made gentle massage of the lens by direct pressnre on the anterior capsule of the lens. This procedure is particularly applicable in those cases of slowly forming cataracts where the vision of both eyes has become sufficiently hazy to interfere with the patient's usual occupation.

Dr. Jackson :

Since the last meeting of the Association I have resorted to the operation then described by Dr. White, for preliminary ripening, in seven cases, six of which I have since extracted without any trouble and with good results. Five of the patients were over fifty years old ; the results were practically the same. Immediately after the operation there was slight haziness of the anterior surface of the lens, which passed away in a few hours, and at the end of forty-eight hours no change in the opacity. Within three to five days there was perceptible increase in the opacity, and in from one to three weeks complete opacity. The extractions were made at different times, from three weeks to six months after the ripening. The reaction after the operation was very slight, little if any more, than would be due to the tapping of the cornea alone. The after treatment was simply the use of a mydriatic and keeping the lids closed for a few hours until the chamber was re-filled.

The operation is certainly satisfactory in producing the result aimed at. Yet, I think that the chances are almost as good for extracting the lens without having produced this complete opacity. If the opactity were great enough to make the extraction necessary, I think there is no condition of the lens where I would hesitate to do extraction, without any preliminary operation whatever.

Dr. Knapp:

Dr. Knapp said that he had only a very limited experience in ripening cataracts, but he knew that Dr. Born, his associate at the N. Y. Ophthalmic and Aural Institute, had ripened a certain number of cataracts according to the very method of Bettman, and the results had all been good. Nevertheless, Dr. Born had given the ripening operation up as being dispensible in almost all cases.

Dr. Bettman closing:

Lack of time will prevent me from making any extended remarks I must take the next train for Chicago. The great objection to Foerster's operation lies in the fact that not only the lens but the cornea and iris also are subjected to mechanical irritation, which is apt to produce cloudiness of the cornea and iritis. A farther drawback is that the pupillary and coloboma areas become small after the evacuation of the aqueous humor, consequently but a small surface of the lens is triturated. The same objections hold good in White's operation, in fact a smaller surface of the lens is exposed, no iridectomy being made. It is in my mind inferior to Foerster's. Dr. Jackson is mistaken if he thinks the posterior surface of the lens is not affected by trituration. In the first place it is known that the posterior cortex is much thinner than the anterior; furthermore my experiments on rabbits have proven that the posterior cortex breaks down and becomes opaque sooner than the anterior.

## EXTRACTION OF CATARACT IN A NEGRO SAID TO BE 116 YEARS OLD,

By FRANK TRESTER SMITH M.D., AND B. F. TRAVIS, M.D.,

Chattanooga, Tenn.

The only point of interest in this case was from the age of the patient which was probably 95, although her family maintained that she was 116. She presented the senile condition in a marked degree. The authors concluded that the case illustrated that old age was no contraindication for the cataract operation.

## CONGENITAL DISLOCATION OF THE LENSES.

[Dr. J. H. Taylor, of Wilkesbarre, Pa , read a paper on the above subject, but an abstract has not been furnished. A part of the discussion was not returned when sent for correction. We publish below some of the discussion.—Editor.]

Dr. Knapp:

I had a very interesting case of outward dislocation of both lenses. When I saw the patient he was thirty years old. His mother had the same trouble, also a nephew and two nieces. He had tetropia (quadruple vision), i. e., double vision in each eye, and he squinted. One image was formed in each eye by the light passing through the cornea and lens and the other by the light passing through the cornea alone. In each eye he thus had simultaneously myopia one-fourth and hypermetropia one-fourth. By giving him either a concave or convex glass of one-fourth, the one image was made sharp while the other became so blurred that it disturbed him but little. In this way his tetropia was reduced to diplopia, and this by a squint operation to single vision. It was one of the most singular cases I have ever seen. I mentioned it in some publication but have forgotten where.

Dr. Taylor's closing:

In my case the lenses were so far drawn to one side that the patient had accustomed himself to look through the pupillary space not occupied by lens, as if he had been operated on for cataract. I saw the father of this family and found he was highly hypermetropic but with no dislocation of the lenses.

# A STUDY OF THE ETIOLOGY OF BLINDNESS IN BLIND ASYLUMS WITH REFERENCE TO PREVENTABLE BLINDNESS.

By GEO. F. KLIPER, M.D.,

La Fayette, Ind.

A table dealing with 1,410 cases of blindness is the text of the paper. The essayist apologizes for the inaccuracies in his report because of the inaccuracies presented by the reports sent him.

The table is divided into four sections:

(a) Number of inmates.
(b) Unavoidable causes.
(c) Preventable causes.
(d) Miscellaneous causes.

The unavoidable causes are discussed to show how much may be classified under preventable causes.

The amount of blindness preventable is 25.3% and counting errors under unavoidable causes, it may bring the preventable blindness to 50%. Comparisons are made with Magnus' table and with Noyes', which is compiled from Schmidt-Rimpler, Stolte, Uhthoff, Hirschberg and others.

An estimate as to the productive wealth lost is given as about $515,000 yearly for these 1,410.

An interesting part of the essay is a table showing the cost of educating each person in the various schools. The average runs from $103.63 per year in Minnesota, to $632.17 yearly in Maryland.

The total cost of educating them is then given as $368,574 yearly.

The total amount of productive wealth lost, in the United States from ophthalmia neonatorum is given as $21,900,000 yearly.

The preventable causes are briefly discussed separately showing how to prevent blindness.

The essay ends with an exhortation to all physicians, to make careful records of all blind persons in their practice, and to procure some wise legislation upon the subject.

# LEGISLATION IN UNITED STATES FOR PREVENTION OF BLINDNESS,

By LUCIEN HOWE, M.D., Buffalo, N. Y.

The examination of inmates of Blind Asylums shows that from sixteen to twenty per cent. of the inmates are there as the result of ophthalmia neonatorum. As this disease is practically one which can be considered preventable, it behooves all those interested in philanthropic movements, and especially oculists who have occasion to see the ravages of this disease, to interest themselves in obtaining laws which shall bring these children to the attention of some legally qualified practitioner in as early a stage of the disease as possible.

Such a law has been passed in the state of New York, requiring nurses and midwives to report any inflammation or redness of the eye within twenty-four hours. A similar law has been passed by the legislature of the state of Maine and is contemplated or already proposed in the state of Illinois, Connecticut, Pennsylvania and also in Canada. The advisability of such legislation speaks for itself, and is not only easily obtained, but if the law were more extended, would undoubtedly result in the lessening of the blind, by many hundreds if not thousands in the United States.

## DISCUSSION.

Dr. Gould:

I would like to ask has this Association, as an Association, taken any action by which we can urge upon the part of the legislature, the passage of such a law? Would it not be well for us to take this action now, either by the appointment of a committee or in some other way? I think this is a very important subject, and one on which we should take some action very soon. I will ask that the Association appoint a committee, whose names would give character to the work, at once. Such an action would be a very great credit to the Association.

Dr. Williams:

During the last winter I was a member of the legislature of my state. While in the legislature I procured the enactment of an important law, which in substance is: the midwife or nurse having charge of a newly born infant, who may have any inflammation or disease of the eye within two months after its birth, shall report the case to the city or county physician who is required to visit the child immediately, and if he finds the child not under the care of a competent physician he must take charge of the case himself, or see that it is attended to properly until cured.

Dr. Young:

Some two years ago I got a complete copy of Dr. Howe's paper and recognized its importance. I had a bill drafted and introduced into the legislature of my state, but the bill failed to pass, I suppose partly because of my negligence. I have the bill and will try and have it passed at the next session of the legislature.

Dr. Randall:

Last winter I had the misfortune to have under my charge a case of ophthalmia neonatorum which had been treated with the utmost care from its start. The child was treated at birth by the general practitioner with antiseptic cleansing of the eyes. I was called in after the first week. While I did all in my power to save the child's eyes, treating them myself day and night with all the skill that within me lay, I lost both of them. The case was one in which I could see nothing that was left undone; and still the result was loss of vision in both eyes. Fortunately the parties were my friends. There are doctors who will have such cases that will probably not meet with the kindly judgement that was accorded me in this matter: and they might not be able to stand under the blow of condemnation that may fall upon them.

For the protection of ourselves and others we should be very careful in declaring too strongly that blindness can always be prevented in these cases.

Dr. Würdemann:

Such legislation carried through the legislatures of all the states would be very valuable to the cause of suffering humanity. We have nothing like it in our own state. For years the reputable members of the profession have been endeavoring to get a mild medical bill passed by our legislature, but without avail. Perhaps a law for the prevention of ophthalmia neonatorum like that proposed by Dr. Howe, might be taken through. We will try it at any rate within a short period. Dr. Randall's question, "Is blindness from ophthalmia neonatorum always preventable?" occurred to me during the reading of the paper. Some cases are undoubtedly infected before birth, and even in the membranes as in a case lately reported by Nieden. It has been my fortune to see, within a short period, three cases of the disease that probably happened before birth as on delivery of the head the lids were agglutinated, and when opened there was a purulent discharge. All three cases were attended by physicians, two of whom are noted for their antiseptic midwifery, and every proper means was used, but they all went to the bad. In the city of Milwaukee there are more midwives than physicians, and in consequence we see considerable of infantile ophthalmia. Albeit so we must be careful just how strong we make our statements about the prevention and cure of this disease, as many eyes become blind, even under the best of treatment: and where such is the case, the physician will be all the more blamed.

Dr. Taylor:

I still think that the majority of these cases can be cured as well as prevented. The greatest thing is not in giving directions as to what should be done, but in seeing that these directions are carefully and faithfully carried out The physician can prescribe what he knows, and he ought to be successful in every case where it is taken in time. I believe that nearly every case of ophthalmia neonatorum can be cured or prevented.

## ALBINISM OF EYES.

By G. M. GOULD, M. D., PHILADELPHIA, PA.

Dr. Gould read a paper on *the Pernicious Influence of Albinism on the Eye*, in which, from a study of the families of albinos, the conclusions reached show that the common idea of a general morbidity, mental and physiological, of albinos is entirely incorrect. The sole distinguishing abnormality is the lack of the normal pigmentation of the dermic structures together with the natural results from this defect. The only pathological result of any importance is upon the eyes, which with the exception of non-pigmentation of the iris, are normal. From this non-pigmentation of the iris arises a flooding of the retina with an injurious quantity of light, and hence photophobia. From the same cause comes an inability to form a definite clear-cut image on the retina and a resultant nystagmus—an endeavor to locate the image on a less-exhausted and more darkened portion of the retina. This nystagmus is at first entirely physiological, and always remains largely physiological. From the endeavor to shut out the flood of light arises the intense compression of the globe by the lids, which explains the enormous degree of hyperopic astigmatism at axes 90°. The amblyopia always present is due to the combined action of the over-stimulation of the retina with ill-defined and flashing images. Thus the entire series of morbid ocular phenomena, the photophobia, amblyopia, nystagmus, and ametropia are traced to a common cause. Interesting suggestions and experimentation to prevent and cure the consequences of ocular albinism were described.

Dr. Murrell:

I did not hear the first part of this paper but heard only the latter part. I have a case of this kind under observation at home. By wearing the properly correcting convex spheres, about two dioptres, ground on blue glass, her eyes are very quiet and she has practically very good vision. Her eyes are quiet as long as the glasses remain on; but, on taking them off, her eyes resume their former nystagmus

Dr. Gould closing:

I would like to ask the gentlemen when they have such cases to please send me a report of them.

## CLASSIFICATION OF DISEASES OF THE EYE.

By EDWARD JACKSON, M.D.,

Philadelphia, Pa.

Dr. Edward Jackson, of Philadelphia, called attention to the fact that the scientific value of hospital statistics, and the ease with which they might be used, would be greatly increased by uniformity in the classification of cases; and suggested the appointment of a committee to consider this subject. In many respects the reports of the Opthalmological Hospitals of the country agree, but in other points there is need for greater uniformity.

THE REQUIREMENTS FOR SUCH A CLASSIFICATION ARE:

It must not be so minute as to be seriously burdensome. Points on which there is no general agreement must be left untouched, however interesting they may be to certain individuals. The first general grouping must be made on some general, rigid, definite basis, probably the anatomical basis already most generally employed. Then within the general classes so established, individual conditions can be recognized on a clinical or pathological basis, but there must be no overlapping. Where two names are given for the same condition, they must be given clearly as synonyms, leaving no choice as to which of two heads certain cases may be grouped under.

It will probably be best to give up any attempt to make the number of diagnoses balance the number of patients, but rather to note the statistics of each distinct pathological condition present, allowing the same case to appear thus under different headings.

With regard to nomenclature, the writer favored the adoption of strictly English names throughout; adopting or anglicizing foreign terms where necessary.

Whatever system of classification is adopted, it must be capable of future development without radical re-arrangement, and, for this reason should be simple and attempt little refinement, the main point now being to fix on principal groups that will not need future alterations. Subdivisions within these groups can be agreed on in the future, or made for the time by individual surgeons.

# A CONVENIENT PRISM SCALE.

By S. LEWIS ZIEGLER, M.D.,

Ophthalmic Surgeon to St. Joseph's Hospital; Assistant Surgeon, Wills' Eye Hospital.

PHILADELPHIA, PA.

The study of heterophoria has developed the need of a rapid and accurate method of neutralizing prismatic lenses. A "Prism Scale" for this purpose was first suggested by Maddox in 1889: and in 1891 Prentice announced his "Prismometric Scale."

Such a scale should possess a prominent base line for leveling the prism, an index line to register the degree of deviation by displacement along the scale, and linear graduations arranged on a plane surface. By the use of two such scales, one horizontal and the other vertical, a spectacle lens can be neutralized in the horizontal position, as worn by the patient.

The author in 1889 devised a simple "Prism Scale" which has proved of great convenience. It possesses the following qualifications:

1. The scale is arranged on a plane surface of cardboard or heavy paper.
2. The prism unit is adjusted for a "deviation of two centimeters at a distance of two meters."
3. It possesses both a horizontal scale in black, and a vertical scale in red.
4. The index line of one scale is the base line of the other other scale, and vice versa.
5. The index or base lines are heavier than the degree graduations, and terminate in arrow-head indicators.

6. The scale is graduated for degrees and half degrees, the horizontal scale extending to 20° and the vertical one to 10°.

7. For the sake of quick readings the even and odd numbers are arranged on different levels.

8. The two scales are so joined that the angle of a "resultant" prism can be easily ascertained before prescribing, or the strength as quickly measured after it has been ground.

The method of using the scale is given in detail with illustrations of each position the displaced prismatic field may assume·

A special method is given for prescribing and neutralizing "resultant" prisms, based on the use of prisms of whole degree, so rotated as to give the exact registration in the vertical plane, and an approximate reading in the horizontal plane. We thus avoid the use of fractional prisms which the optician cannot easily grind.

This scale possesses a threefold advantage of simultaneously showing that our sphero-cylinder is properly neutralized, accurately centred, and the desired prismatic strength correctly measured.

[CONCLUDED.]

# A CASE OF ENOPHTHALMUS TRAUMATICUS.*

By LOUIS F. LOVE, M.D.,

PHILADELPHIA, PA.

Ophthalmic Surgeon to St. Mary's Hospital, &c.

I wish to present to the attention of the Section the accompanying photographs† and description of a case of Enopthalmus Traumaticus. Examining the photographs, it will be seen that the right eye presents the appearance of being sunken in the orbit, as indeed it is. The under lid with its loose and baggy folds shows an almost complete absorption of the underlying fat, and that this condition of absorption extends to the whole cushion of fat in the orbit, is evident from the fact that the ball is retracted from 6 to 7 millimetres. The retraction gives the eye the appearance of an artificial eye, an appearance which is enhanced by the apparent smallness of the globe. The globe is in reality, however, the same size as its fellow. Micropthalmus was absolutely excluded. The old scar which is visible on the nose has nothing to do with the present disease. The history of the case is as follows:

P. McC, age 35, was struck with the fist in the right orbital region in March, 1893, the blow being quite a severe one and causing a large swelling of both lids. There was no external wound. The swelling remained for about two weeks and was not treated except by domestic remedies. After the subsidence of the swelling, he noticed that the eye appeared smaller than its fellow, and this condition had continued up to the time he presented himself for treatment, three months after the date of the injury. At no time had he suffered pain in the eye itself and vision was excellent.

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* Read before the Ophthalmological Section, Pan-American Medical Congress.

† Not inserted for want of space.

O. D. V. = $\frac{6}{6}$ ? ?

O. S. V. = $\frac{6}{6}$ ?

On examination the globe is found to be retracted 6 or 7 millimetres but is normal in size; there is no apparent paralysis of any of the ocular muscles, but the movement of the globe was markedly limited in all directions. The lower lid is thrown into folds and presents a flabby appearance. There is no ptosis, and the patient states that at no time was double vision present. The right pupil is about two millimetres in size; the left about 2½, both actively responsive to light.

Ophthalmoscopic examination showed media clear, disc oval, axis 90°, good tint, vessels normal in size and carrying good blood. In a word, there was apparently no gross pathological changes.

The case which I have thus briefly presented appears to be almost unique. The cases heretofore reported have almost invariably been connected with fracture of some of the bones of the orbit, or were the result of age or disease. In this case there was no evidence whatever of fracture, and all the circumstances pointed to its having resulted from direct violence in a young and healthy man. The literature upon the subject is exceedingly meagre. Dr. Hansell, in reporting a case to the Philadelphia County Medical Society,* in which a fracture of the orbital plate of the ethmoid bone existed, has collected what little there is. The older authors are silent on the subject of Traumatic Enophthalmus, with a few exceptions, and only refer to enophthalmus produced by disease in an incidental manner·

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* Proceedings of the Philadelphia County Medical Society, Vol. XI, '90.

Two cases reported by Gessner (Archiv. fur. Augenherlkunde Bd. XVIII Hft. III), and quoted by Dr. Hansell, are similar to mine. In both of these cases the orbital region was lacerated by injury, and a few weeks later enophthalmus of the ball was noted. In both cases the condition remained permanent. A plausible explanation of the condition is that a cicatrical contraction of the retro-bulbar fat and cellular tissue occurs as the result of inflammatory reaction, following a wound in this neighborhood. In the case I have the honor to report there was no evidence of wound or deep-seated lesion, though whether the inflammation of the cellular tissue about the eye could have extended to retro-bulbar tissue and could have been followed by cicatricial contraction, or more probably by absorption, cannot certainly be stated. It is possible that the injury caused a general infiltration of inflammatory products throughout the orbital tissue and that when these products were removed by absorption that much of the normal tissue was absorbed with them. But what should cause such an abnormal absorption, and if such should be the cause, why do we not see more of such results following a blow in this region? We know very little of the trophic nerve system, or even of the normal method of absorption in the orbital region, yet physiological investigation has furnished some facts which may bear upon this case I am indebted to Dr. Charles K. Mills for literature which he has placed at my disposal.

Claude Bernard called attention to the fact that the contraction of the pupil after division of the sympathetic is constantly accompanied by retraction of the globe of the eye, flattening of the cornea and decrease in the size of the palpebral fissure. The same phenomena he saw also after division of the anterior roots of the two first dorsal nerves, and after section of the spinal marrow at the level of the first and second dorsal vertebræ. Irritation of the divided sympathetic or of the peripheral ends of the several anterior roots, gave opposite results, prominence of the globe, bulging of the cornea, and enlargement of the palpebral fissure.

H. Muller (musculus orbitalis-smooth muscular fiibres found in the membrana orbitalis)* discovered in the anterior orbital fissure a reddish gray mass consisting of bundles of unstriped muscular fibre with elastic tendons analogous to the orbital membrane of the mammalia. He supposed that its action is to protrude the eye-ball. It is supplied by fibres from the sympathetic and irritating the latter in the neck has been found to cause protrusion of the eye. perhaps through the action of this muscle. †

Sappy has described similar muscles in the orbital aponeuroses. ‡

The well-known experiments of Euhlenberg and Guttmann on the cervical sympathetic may also be referred to. §

In conclusion, I will state that the case has been kept under observation and any further changes will be noted carefully. The condition is, of course, irremediable by surgical or other means.

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* Billings' National Medical Dictionary, Vol. II.

† Soelberg Wells, by Bull, A Treatise on Diseases of the Eye.

‡ Sappy's Anatomy, 1876—1879.

§ Journal of Mental Science, Vol. XXXIII 1883.

# A TEXT-BOOK OF OPHTHALMOLOGY.*

By WM. F. NORRIS, A.M., M.D.,
Prof. of Ophthalmology, University of Pa., Surgeon to Wills' Hospital;
AND CHAS. A. OLIVER, A.M., M.D.,
Surgeon to Wills' Hospital.

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* Illustrated with 357 cuts and 5 colored plates. Price $5.00 in cloth and $6.00 in leather. Lea Brothers & Co., Publishers, Philadelphia, Pa. July, 1893.

These two well-known and able Authors have given to us in this volume of 641 pages the results of seven years' investigation of the writings of numerous men and pains-taking personal observation, all undertaken with the view of giving to the medical world a concise, scientific and practical view of ophthalmology. Their reading and experience prior to this undertaking constituted a good foundation on which to build the superstructure which they have given us.

In a work designed for students (in the sense of beginners) and busy practitioners, one would not expect to find every subject treated to its fullest extent. Enough for the accomplishment of the purpose stated in the preface has been said on most subjects.

In the first part, consisting of 280 pages, by Dr. Oliver, there is much to be commended, as to both clearness and accuracy. In his chapter on "Examination of the Eye", he gives a very clear outline of the different methods of testing the extra-ocular muscles, after reading which one feels disappointed that he does not give his views of the etiology and management of the several forms of heterophoria That he lays stress on the importance of *determining* these conditions, shows that he knows the necessity of *relieving* them by the means now at our command—in certain cases, lenses; in others, partial tenotomies and rhythmic exercise. His chapter on the shadow-test is instructive and will richly repay the reader.

In his study of the detection of errors of refraction, he gives due prominence to the ophthalmometer, with which he unquestionably has a "working acquaintance", and is therefore not a believer in its infallibility. While he could have said more about it, what he has said ought to convince any reader of its utility.

In the chapter on the correction of errors of refraction, he gives the information that was best up to the time of going to press. That some new rules could now be embodied, that would be of great service, even the author would confess.

If the book consisted of only "Part I", it whuld be a helpful addition to the library of any oculist.

Part II (341 pages), by Dr. Norris, treats almost entirely of diseases of the eye and appendages, and their medicinal and operative treatment, and is both interesting and instructive. In the one page devoted to the operative treatment of heterophoria he speaks cautiously, and not with that degree of clearness that would make operators out of readers.

As a whole this new book will take rank among the best. It merits, and will have, a large sale. G. C. S.

THE

OPHTHALMIC RECORD.

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# OPHTHALMOLOGICAL SECTION OF PAN-AMERICAN MEDICAL CONGRESS.

## SCIENTIFIC PROCEEDINGS OF THE SECOND DAY.

### INTRODUCTORY REMARKS BY

PRESIDENT J. J. CHISOLM, M.D.

To-day we take up the subject of muscle errors. We have been a long time finding out that the extra-ocular muscles, numerous and large as they are, should necessarily play a very important rôle in the comfort and discomfort of eye-work. I cannot say that we have devoted too much time to the study of refractive errors, for ciliary muscle action is undoubtedly the pivot for acute vision. But to keep the fovea centralis in its proper place, to secure binocular vision, is the duty of the recti and oblique muscles. It requires that these six pairs of muscles be nicely adjusted and always alert, for they are in perpetual action during our wakeful hours. Lately I have been devoting much more time in exploring the individual functions of each of these muscles and am quite sure that results are against my former neglect. I hope that the discussion will elicit much knowledge for our future guidance in a class of cases which becomes quite numerous the more carefully we seek them.

# A CLINICAL STUDY OF HETEROPHORIA.

By HIRAM WOODS, M.D., Baltimore, Md.

I fear my paper may seem to some surgeons too elimentary: reactionary rather than progressive. Most of the articles on heterophoria which one meets now-a days in journal literature, show, it seems to me, a tendency toward a refinement of diagnosis and treatment, proper enough in itself and under certain circumstances, but not reaching the question which daily puzzles an oculist in office work: "What is the significance of the heterophoria in the case before him?" Text-books of eight or ten years ago give little or no information. Those by American authors of more recent date discuss the subject more or less fully: but I doubt if Dr. Noyes, or Dr. deSchweinitz, or other recent book writers, would claim that their chapters on muscular asthenopia are more than pointers for original investigation. The more I see of heterophoria, the more I appreciate the truth of a recent remark by Dr. Stevens (*Ophthalmic Record*, Jan. '92): "One will find himself too often in the face of serious embarrassments to believe that he has arrived at the knowledge of an easy system in which all the ultimate facts are at his command." I am often in doubt whether to lay stress upon the refraction and accommodation, or upon the muscular anomaly: whether to regard the latter as really the cause of the asthenopia, headache or other disturbance which has brought my patient to me, or as only symptomatic and secondary:—a guide, so to speak, to the real cause. This question lies at the bottom of every case. It cannot be answered by the *amount* of equilibrium error, for, if my experience has taught me correctly, fractional degrees sometimes cause trouble, and high degrees frequently do not. I wish to present in this paper a few clinical observations in the hope that they may call from those better acquainted with the subject a profitable discussion. I have nothing new to offer; only a study of the findings by methods in common use.

For four or five years I have realized the importance of examining the extrinsic eye muscles. Cases of asthenopia I could not relieve, no matter how carefully I corrected the refraction, and who consulted others with the same result, first turned my attention to the subject in a practical way. I began work by causing diplopia at 20 feet by holding a square prism in front of the eye. For two years I have used Maddox' double prism, with a colored glass before one eye, and more recently his rod. Before examining the muscles I correct the refraction, giving as nearly the full correction as is consistent with the best visual acuity. I note abduction. If the equilibrium test has shown orthophoria, and abduction is 10 or 12 degrees, I suspect "latent" exophoria as it has been called. If it is below 5° I suspect "latent" esophoria. I am skeptical about adduction In the first place, as has been pointed out by others, it is a *distance* test only so far as convergence can act independently of accommodation: i e., to the extent of the positive portion of the relative range of convergence for infinity. Dr. Randall (Trans. American Ophthalmological Society, 1889) says "adduction can be made almost anything, if the patient and examiner have patience." It is striking how rapidly adduction increases as soon as the patient learns how to fuse images of unequal clearness. I have seen adduction of 48°, while the balance test showed exophoria of 10°.

Its determination is not, in my opinion, important unless one is contemplating an internal tenotomy for esophoria, when it is well to know that adduction can be developed to a point higher than the normal relation to abduction, 7 or 8 to 1, as Dr. Noyes gives it (text book).

Unless the equilibrium test has shown hyperphoria, I do not, as a rule, examine the power of the vertical muscles to overcome opposing prisms.

I look upon comparison of the distance and near equilibrium as very important. Except in the case of presbyopia, or when in myopia, conditions exist which demand special modification of the glass for near work, the near test should be made with distance glasses. What relation should the near equilibrium bear to the distance? Dr. Noyes (Loc. cit.) says that "most commonly there is a deviation (from the vertical) in the sense of abduction of about 5° which cannot be called abnormal." Dr. Randall (Loc. cit.) thinks that insufficiency of convergence for the near is the rule among hypermetropes, because the hypermetrope can avoid excessive convergence only by utilizing and developing the negative part of his range of relative convergence and . . . the correction is over-done. Again, two years later before the same Society, in discussing a paper of Dr. Theobald's, he said that while this convergence insufficiency at the near was the rule rather than the exception, he could not accept it as normal any more than he could "accept as normal the hypermetropia which is present in the majority of eyes." As to the frequency of this near divergence, compared to the distance balance, one-hundred consecutive cases from my case book show:

| | |
|---|---|
| Equilibrium the same at 13″ as at 20 feet . . | 16. |
| Comparative divergence at 13″ . . . . . . . . | 81. |
| Comparative convergence at 13″ . . . . . . . | 3. |
| | 100. |

The distance equilibrium of the 100 was: Orthophoria 39, Esophoria 29, Exophoria 28, Hyperphoria 3, Hyper-exophoria 1. This condition, convergence insufficiency, was noted in 23 of the 39 with distance orthophoria, 26 of the 29 with esophoria, all the 28 with exophoria and the 4 with vertical deviation. I do not think another one hundred would differ materially from this. It is clear that the condition is so frequent as to be almost constant, and is not confined to any form of distance equilibrium. Regarding the associated refraction of these 81 cases, 54 were hypermetropic: an apparent confirmation of Dr. Randall's statement that it occurs most frequently in hypermetropic refraction. Myopic refraction was noted in 21 of the 81 with near divergence. Of the entire number (100), 66 showed hypermetropic and 26 myopic refraction. Thus, a divergence at 13 inches relative to the equilibrium at 20 feet, was noted in 81% of persons with hypermetropic, and 80% of persons with myopic refraction, a difference of 1% only. These figures would seem to indicate that divergence at 13 inches is seen most frequently in hypermetropes, because hypermetropia is the most common form of refraction error. Is this divergence at the near, compared to the balance at 20 feet, normal? Can we make any useful inference from a departure from it? In my opinion, we can: and I daily use it as a guide in refraction work.

Dr. Samuel Theobald presented a paper to the American Ophthalmological Society in 1891, entitled: "Sub-normal Accommodative Power in Young Persons, a not Infrequent Cause of Asthenopia." The object of the paper was to show that young persons often become asthenopic without refractive or muscular error; that others continue so after the correction of these errors, and that the cause is a subnormal accommodative power—whether a weak ciliary muscle, or a lens incapable, for one reason or another, of responding to ciliary action. It was pointed out that the usual symptoms of presbyopia do not exist in this condition, but that the diagnosis lies in the relation of the equilibrium test at 13 inches to that at 20 feet. He looked upon a comparative divergence at 13 inches of 2° to 5° as normal. The near balance may depart from this in the direction of excessive or deficient divergence. Excessive divergence may come from myopia through the correllation of the functions of accommodation and convergence. Dr. Theobald thought that low exophoria, which appeared as orthophoria at 20 feet, could cause the same excessive divergence at 13 inches. The exclusion of this, I think, would be easy. There are cases of exophoria which for a time appear as distance orthophoria, but they are generally accompanied by abduction of 10° to 12°, or the retention of the orthophoria balance at 20 feet with an abducting prism. Thirdly, comparative divergence over 5°, may be due to a hypersthenic ciliary muscle, calling for less nerve force, and so causing less nerve force to the internal rectus.

Departure from this "normal" comparative divergence of 2° to 5° in the direction of *deficient divergence* may come from any condition calling for excessive nerve stimulation to the ciliary, and so to the internal rectus. muscle. Uncorrected hypermetropia. a weak ciliary muscle. or an unresponsive lens demanding more than normal ciliary action. are such conditions. Hypermetropia can easily be excluded. Esophoria, by lessening the amount of opposition to the interni, might also cause it: but if the esophoria is not disclosed by the equilibrium test. at 20 feet. low abduction or the retention of orthophoria with an adducting prism would lead us to suspect it. Thus, we are left, with the sub-normal accommodative power. The conclusions drawn by Dr. Theobald are: First, comparative divergence at 13 inches of 2° to 5° is normal. Second, in the absence of the other possible causes, which can be excluded, a comparative divergence greater than 5° means a hypersthenic ciliary muscle, less than 5° sub-normal accommodative power.

A word concerning this near test as modified by refraction correction: First, the relation holds only when the near test is made with the eyes behind the same glasses worn during the distance test. In compound hypermetropic astigmatism, for instance, after mydriasis has disappeared, hypermetropia often becomes latent, the cylinder alone being accepted. The addition of a spherical, correcting any part of the latent hypermetropia, increases the comparative divergence. A case in point: March 1893, Mrs. C., 22 years old, eye-pains and headache on reading. Under homatropine,

R. E. obtained $\frac{20}{20}$ with + 1.50.

L. E. obtained $\frac{20}{20}$ with + 1.25 ⊂ + 0.75 cyl. ax. 90°.

Three days later R. E. Hm. + 0.75, V. = $\frac{20}{20}$
L. E. no Hm. + 0.75 cyl. ax 90°, V. = $\frac{20}{20}$.

Muscles 20 feet: Esophoria 3°, Abduction 5°. Near, esophoria 3°, no comparative divergence at 13 feet. By adding the spherical, equivalent to the latent hypermetropia, near orthophoria was attained, but distant vision was reduced to $\frac{20}{40}$. A message from the lady, in August, '93, was to the effect that these glasses had completely relieved her. My reason for neglecting the esophoria in treatment was the nearly normal abduction (5°). I felt reasonably sure that it was secondary to the uncorrected refraction error, which was of such a nature as to cause excessive internal rectus action. In this comparative divergence I find a guide to the correction of latent hypermetropia. I believe that the nearer we come in our refraction work to an emmetropic correction, the more positive and permanent will be the relief. But the correction of latent hypermetropia often blurs distant vision, and, in low hypermetropic astigmatism especially, the correction of the astigmatism alone frequently relieves. While there are exceptions, I believe a safe rule is to correct enough hypermetropia to produce at 13 inches a comparative divergence of 2° or 3°. Second, in myopia of 3 or 4 D., if the correcting distance glass be employed at 13 inches, there will nearly always be deficient comparative divergence 2° to 5°, disappearing when the strength of the concave is reduced. I believe this is due to the habitual non-use of the ciliary muscle. I have for the past two or three years been in the habit of training young myopes, with normal visual acuity and good fundus, to wear constantly the total correction, provided it does not exceed 5 or 6 D. Reading for a time is difficult, but the ciliary muscle soon learns to work, and the usual comparative divergence at 13 inches develops. Esophoria contra-indicates the use of the strong concaves for near, I think, because of the necesserily increased ciliary, and so internal rectus, activity. But esophoria and myopia of any degree are not frequently associated.

I have dwelt thus at length on the relation of the near to distance equilibrium because I am inclined to think there is a tendency to underrate the value of the near test. It is useless as a test for muscular equilibrium: but if its relation to the distance balance has such significance as Dr. Theobald has given it, it is useful not only as a diagnostic sign of sub-normal accommodative power, but as a guide in treatment in at least one form of heterophoria, viz., esophoria. If this condition occurs, as it usually does, with hypermetropic refraction, the indication would be to correct all or nearly all of the hypermetropia; and the more nearly the 13 inch balance corresponds with that of 20 feet, the more of the hypermetropia should be corrected. I have already spoken of esophoria contra-indicating strong concaves at the near. When there is no refraction error and the esophoria is to be attacked independently, an excess of near divergence indicates a weaker adducting prism than if the comparative divergence at 13″ is of the usual degree, or deficient. In esophoria prisms, according to my experience, give us their best results, and this guide to regulating their strength is with me not a mere theory.

Contradictory findings by the various tests are a common cause of perplexity. Different results may be gotten at different sittings, the equilibrium tests and the power of the muscles to overcome opposing prisms may not harmonize. Such things

Dr. Stevens has attributed to hyperphoria. That this variety of heterophoria does influence the others cannot be doubted. I want to mention two or three cases, however, which show, I think, how close the connection is between anomalies of the ciliary muscle and heterophoria.

Mr. G , aged 28, consulted me in April, 1890. He was unable to work comfortably at his desk in the postoffice. He was wearing —0.25 cyl ax 180° with V. = $\frac{20}{15}$. He rejected all convex glasses. He had orthophoria at 20 feet with abduction of 12°. A near test was not made at that time. Under atropia his apparent low myopic astigmatism was turned into compound hypermetropic astigmatism, each eye accepting + 1.5 ⊃ + 0.5 cyl ax. 90°. As mydriasis wore off, convex glasses reduced vision to about $\frac{20}{40}$ Minus cylinders at once cleared vision, but he found that he could work better with the convex glasses. For a year or so he called to see me occasionally. He always had orthophoria and high abduction 10° to 12°. He gradually got $\frac{20}{20}$ with his convex glasses, and still more gradually developed an exophoria which in the end amounted to 6°. He has since then worn prisms 2°, bases in, combined with his total refraction correction, and is comfortable. This seems to me to be a case of exophoria concealed by an excessive inervation of the weak muscle, associated with ciliary spasm. An abduction too high for the equilibrium was the only indication. The exophoria, was, I believe, a factor in producing the ciliary spasm.

My assistant at the Presbyterian Hospital called my attention a few months ago to a case of a seamstress twenty-three years old, who had only $\frac{15}{40}$ V., when he first examined her, improved by minus glasses. Homatropine gave her $\frac{15}{30}$ and atropia, used for several days, had brought her to $\frac{15}{15}$ with a + 0.75 S. The girl had persistent headaches, and the refraction did not account for either them or this ciliary condition. The equilibrium test at 15 feet showed exophoria of 9° with abduction of 10°. The explanation seemed clear:—exophoria with secondary ciliary spasm. I have seen several such cases as these, but it is useless to narrate them. The points I desire to make are that a contradiction between equilibrium and abduction requires careful investigation: that a weak internal rectus may produce ciliary trouble and this contradiction be the only clue to the real cause. Neither of these cases had any manifest or latent vertical deviation.

A second anomalous finding I have met at 20 feet is exophoria with normal abduction.

Mr. W., 23 years old, student, was first seen in 1887. He was unable to work over half an hour without pain. Glasses had so far failed to relieve him, though selected by a competent man. His refraction under atropia was:

R. E. $\frac{20}{20}$ with — 2.25 ○ — 0.5 cyl. ax. 45°.

L. E. $\frac{20}{20}$ with — 4.00 ○ — 0.75 cyl. ax. 180°.

The muscle test at 20 feet was: exophoria 4°, abduction 6°; at 13 inches, adduction 24°, exophoria 4°, same as at 20 feet. The amplitude of accommodation was only 2.5 D. He was given the full correction for the right eye for distance, with the same spherical correction over the astigmatism for his left. On account of his weak accommodation, only the cylinder was ordered for his best eye (the right), the cylinder and—.75 sphere for the left. He read at 13 inches with these, either eye. For a time he was better, and then the old symptoms returned. Not to prolong the case, after two years of tonic, electric and other time-wasting methods of treatment, advised by myself and others, it was decided to get rid of the exophoria. I did external tenotomy. At first an esophoria of 3° resulted, but in a few days orthophoria was found. The therapeutic results were absolutely nil. Work over fifteen minutes was an impossibility. In a year (1890) there was the old muscular condition. At my suggestion Mr. W., went to New York in the fall of 1890 and consulted

Dr. David Webster. Dr. Webster expressed the opinion that every thing had been tried except to make the accommodation work. He advised full correction on both eyes for all work. Mr. W., put on his glasses, and for nearly two months held his reading (when he did any) at arm's length. His discomfort was greater than ever. Still he persevered and gradually his near point came within respectable limits. His condition now is, to use his own words, "as good as it probably will ever be." He can read and write for several hours, and follows his occupation of civil engineer. His exophoria has disappeared at 20 feet, and his abduction is 6°; at 13 inches he has 1° to 2° of exophoria Here, it seems to me, was a case of weak ciliary muscles. Because of the myopia they did not receive the extra nerve force, spoken of, and so the internal recti did not receive it either. The result was pseudo-exophoria and the *normal abduction* should have been a clue.

A third anomalous finding at 20 feet, which I have noticed in connection with hypermetropic astigmatism, especially against the rule, is esophoria with normal or even high abduction. Time will not allow cases in detail. Suffice to say that they usually show deficient comparative divergence at 13 inches, and that the esophoria nearly always disappears after the correcting cylinders have been worn for a time. Their explanation is to be found, I believe, in the excessive and irregular action of the ciliary muscle called out by the uncorrected refraction error.

I would not be understood as expressing doubt that all kinds of heterophoria can cause distressing asthenopia: that even when refraction errors exist, the muscular error may be the most important element. I have had a personal experience with esophoria, and know how to appreciate the value of adducting prisms, and, later, the internal tenotomy which my friend, Dr. Harlan, did for me last March. But in such cases as I have narrated, when one test contradicts another, I believe it behooves us to move slowly; to find the underlying cause by patient, repeated investigation before we put on prisms except for diagnosis, proceed with exercise or do tenotomy. I believe this cause is found in the accommodation or the associated refraction error more commonly than is generally thought; and that frequently muscular perplexities will clear up behind spherical or cylindrical glasses. When there is nothing found of importance except the muscular error it is foolish to delay.

I should like to discuss some other points, but I can only mention them. I have not met hyperphoria as often as some others seem to meet it, but I have seldom seen it exist to the extent of one and a half or two degrees without requiring treatment. I have had in a few patients to correct, by prisms, as little as $\frac{1}{2}°$ or $\frac{3}{4}°$, and with good results, after refraction correction had failed to relieve. Again, I believe there is a good deal in the association of certain refraction errors and different forms of heterophoria. Hypermetropia and exophoria, myopia and esophoria, low degrees of heterophoria and astigmatism against the rule, have seemed to me specially troublesome combinations.

There are certain symptoms which I think characteristic of muscular asthenopia. They are mentioned in Dr. Noyes' book, and in my own case I have noted them, I am sorry to say, in an emphatic way: a sense of tension while reading; occasional paroxisms of pain in the eye-balls, lasting sometimes two or three hours; pain on awakening in the morning, and an indefinite, but, as I know by experience, positive symptom which a gent'eman a short time ago thus described to me: "my eyes just won't work," i. e., a sudden collapse while at work. Such symptoms I believe are usually due to the muscular anomaly.

To review the entire subject of heterophoria in one paper is an impossibility, and I must leave the question of treatment almost untouched. By exercising the weak muscles with prisms, I have gotten good results in a few cases of exophoria, but in the other forms of heterophoria I have found it useless. I am now trying Dr. Savage's "Rhythmic Exercise," but cannot yet say much about it. Prisms have given me best results in esophoria, and very low degrees of hyperphoria. I have never done tenotomy for less than 6° of esophoria, 4° of exophoria and 2° of hyperphoria.

I have always done complete tenotomy. The operation in some instances, where the error was low, was undertaken only after other treatment had failed. It was "complete" only because repeated examinations during the "partial" stage failed to show any equilibrium gain. I know it is behind the times to say so, but I have never noted any change in the equilibrium test at 20 feet, until I had thought I had severed the entire tendon. I meet cases in practice where prisms are not tolerated, although evidently the muscular anomaly is causing the trouble, and I know there is not room for a complete tenotomy. I hope to get some light on this question to-day.

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# SOME CONSIDERATIONS RESPECTING EXAMINATIONS AND TREATMENT IN HETEROPHORIA,

By GEO. T. STEVENS, M.D.,

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Perhaps I may be pardoned, in consideration of the subject assigned for this day's discussions, if I indulge in some satisfaction when I contrast the sentiments prevailing among oculists at the present time, regarding that subject, with those which prevailed only a few years since.

At the meeting of the Ninth International Medical Congress, held in this city in 1887, just six years ago, I read before this section, the same gentleman presiding who now occupies the chair, a paper with the title: "Some Important Problems Respecting Insufficiencies of the Ocular Muscles."

Directly after the publication of this title in the medical journals, I was violently criticised in some of the leading periodicals, not for the special views contained in that paper, for it had not yet appeared in print, but for the presumption of suggesting that there were any problems regarding what were then known as insufficiences of the ocular muscles. The public was emphatically informed, in effect, that all the problems in this department of science had long ago been solved and that there was nothing more for me to suggest nor for the profession to consider.

The writers undoubtedly voiced the prevailing sentiment of the profession at the time: otherwise had they expressed only their individual views, there would be no occasion for recurring to the incident here.

To-day, six years later, this Section of this great Congress assigns one entire day to the study of the very problems which, six years ago, we were told had already reached a final solution

When, at the request of the President of this section, I consented to participate in this discussion, I was in doubt what I could best offer for your consideration. In reply to my appeals to the President to tell me what part of the subject he wished me to present, he gave me the whole field to discuss, but he did not give me more than one day in which to do it. At the last hour I have determined to speak, not of new things, but to direct your attention to some things of which I have already spoken, but placing them in a light which may possibly encourage some inquirer. If I shall be able to accomplish that, I shall be glad that I have chosen this course.

In the first place, I venture some words in regard to examinations for heterophoria. Perhaps the suggestions that I am to make are needless repetitions, yet I am led to the belief, by examining much of the current literature of the subject, that it may not be out of place to call attention to the fact that deduction from many points of view and much careful and logical thinking are essential elements in the making of these investigations.

It is not, in the brief time allotted to me, possible to go into any details of examinations, but permit me to suggest an order, and some important points which may be brought out by an orderly examination.

The facial expression of our patients will often give us strong hints of what we may expect to find. Indeed these expressions are so well marked in their relation to the condition of the ocular muscles that one who has had considerable observation, and who is withal a close observer, will rarely fail to make a general, though tentative, diagnosis of his case without the aid of his instruments. Of course this is not a working diagnosis, but it is a valuable aid to that which is to follow: and often serves to direct the attention to slight inconsistencies in the instrumental examinations which otherwise might escape notice. A glance at the eyes themselves and at their movements prepares us, after we have learned what is necessary of their refractive condition, for the more exact examination.

First, in order, after considering well the facial expressions and the movements, the phorometer is brought into use and its results recorded. If other instruments than the phorometer are employed for the purpose of indicating the manifest heterophoric tendencies, either by induced diplopia or by contrasting images, let me repeat what I have already said elsewhere, that no instrument of this class which is held near the eyes, or the correcting prism of which is brought close to the eyes, can be relied upon for such exact examinations as should be obtained if we are to make a critical study of our case. Some of the instruments which are in common use will give us false information to the extent of many degrees. The tendency to overcome a deviation of the images from the vertical or horizontal lines is similar to, if not as strong as, the instinct to unite images by overcoming prisms. If the phorometer is placed at the ditance of from four to six inches in front of the eyes, these adjustments which are so naturally made, are either entirely, or in a large measure, neutralized.

In whatever way we ascertain the phorometric measurements, we must bear in mind the important fact that we have arrived at only a single stage of the examination, and that other classes of facts must enter into the question of interpretation of the ocular adjustments.

We must ascertain the abducting and sursumducting ability and perhaps also the adducting ability. We are to observe the the action of each eye when temporarily excluded from fixation and when it returns to fixation.

If, assuming the standard abduction to be 8° at twenty feet, a standard adopted by myself many years ago and which experience had shown to be a correct one, we find that it corresponds to the record of the phorometer, and if the sursumduction, right and left, also corresponds to the indication of the phorometer, we may fairly assume that we have an uncomplicated case in which the reading of the phorometer may be taken as an index of the actual condition, so far as the kind of tendency is concerned. But if, as often happens, the records of the various tests, for example, the phorometer, the abducting ability, the deviation in exclusion, are not in harmony, we are to search for the cause for this want of correspondence. For example, if by the phorometer we find esophoria 2° and abduction 6° or even 5°, with equal sursumduction and no hyperphoria, we arrrive at the conclusion that we are dealing with a case of simple esophoria, 2° of which is now manifest. On the other hand, should we find esophoria 2° with abduction of 10°, or exophoria of 2° with abduction of 6°, we may at once conclude that we have a complicated case even although there is no manifest hyperphoria, and one which must demand the most careful attention before any redical measure of treatment is adopted.

There are so many forms of these contradictory indications that I can only allude to them as a class, as indications for the most careful study of the cases and as warnings that we must in no case assume that one class of testing tells us the whole truth. We should note the facial expression, test by the phorometer, try the ability to overcome prisms, examine carefully the rotating ability of each muscle and the action of one or other eye when excluded from fixation. These and often many other points are to constitute elements in our examination.

And here let me add that if we are, at the present stage of knowledge of this subject, to publish our case, the bare statement that the patient had an abduction of only 5° or that the phorometer showed a certain degree and form of heterophoria, will not suffice for critical readers. Such readers must know much more about that case. They have seen too many instances in which there was an abduction of 12° with an actual converging squint, to accept such a bare statement as having any scientific value. Moreover, such barren statements leave in the mind of the critical reader the impression that the writer had not himself ascertained the remaining facts necessary to a just conclusion in regard to the nature of his case.

A single word more regarding these examinations. Contrary to the general impression and contrary to my own teachings of many years ago, the correction of the refractive anomalies by glasses during an examination of this kind is not only in the vast majority of cases unnecessary, but positively detrimental, as the glasses themselves often lead to error and their absence does not, as a rule, influence the muscular conditions.

And now that we have, in the few minutes, gone over the examinations in heterophoria, a subject which for its proper consideration would require the patient study of many months, let us as briefly sketch an outline of some of the methods for the management of the defects which we may have discovered. Let no one suppose that this sketch can be in any degree more than suggestive.

One of the first of the elements in the management of these cases is patience. The oculist who imagines that he can measure and correct his cases of heterophoria in an off-hand manner, has not reached an understanding of the first principles of the subject. A case which at first appears qute simple and easy to handle may prove to be one which, for its best correction, may demand the exercise of great skill and of unwearied patience during many months.

We cannot know when we begin the treatment of a case of heterophoria the full meaning of the indications which we then discover. One who thinks that he has found an instrument which will reveal latent heterophoria is surely laboring under a misapprehension. As we go on in the treatment of these cases new difficulties may arise and new efforts may be demanded. This is no reason for not beginning the work and less for abandoning it before completion.

I have sometimes illustrated these progressive difficulties by recalling the experience of one who climbs a mountain. He sees before him a height which appears to him the summit which is to reward him for his effort, but when he reaches this he sees before him another even higher than the one which he has surmounted. He ascends higher, and when at length he attains to the second height, the real summit is still above him. Is he therefore to say "there is no end of this, and one might climb indefinitely without finding the summit"? There is a summit and one may reach it if he has the needful strength and courage.

I am sometimes asked by my colleagues if there is no end to the treatment of these cases? Does not the condition which has been apparently removed return? Must the treatment not continue indefinitely?

The heterophoric condition which has been in any measure properly corrected does not return, but that part of the original defect which was at one time latent may at a subsequent time become manifest.

There is as surely a limit to this work as there is a final summit to the mountain, and when one reaches that limit he has an infinitely greater satisfaction than he who finally gazes upon the grand stretch of hills and plains and lakes from the great elevation which he has earned.

Many who do not care to take the trouble to climb decline to accept the reports of those who do, and many an eminent man who has lingered about the foot-hills of this work is incredulous because he cannot obtain the same grand view that has been described by some one who has gone beyond.

An essential to success in this work must be a thorough knowledge of the principles governing the tensions of the muscles with which we work.

Instruments cannot know these principles. They are only to be learned by long and patient research on the part of the oculist.

But what immediate steps are we to take for the relief of our patients with heterophoria?

We may give him prisms. Will they help? Semetimes, and to a very limited extent. In the large majority of cases they will serve little purpose or perhaps produce decided annoyance. In the cases in which they afford relief, that relief is in no sense the effectual degree of comfort and the absence of reflex trouble which may be expected from the more radical relief of abolishing the heterophoric condition.

Then, we may give to the muscles the gymnastic exercise which may be accomplished by the overcoming of prisms.

That good may be accomplished in this way, I have long ago demonstrated. The fact remains that the method is but tentative. The anomalous conditions remain and the unpleasant symptoms will probably return. A vast experience with these methods enables me, I believe, to speak of them with some degree of authority, and I do not hesitate to say that while they have much value to recommend them, and while no one can afford to overlook them, they fall far short of the more rational measures of actual adjustments by means of eqaulizing the tensions in such a way as to establish practical orthophoria.

We may accomplish this by graduated tenotomies and by tendon contractions.

Are we then to operate for all cases of heterophoria? By no means The surroundings of the patient, his methods of work, the importance of the case, and many such considerations must enter into the question of treatment. The best judgment of the experienced surgeon is here in demand.

In most cases, however, in which important reflex disturbances are the result of heterophoria, we shall find operative measures imperative.

How are we to operate? I must reply first in the negative: how we are not to operate. We are not to operate by the method described in the text books which I have seen. Indeed, if I may be permitted to diverge from our strict line of thought in a single sentence, I will add, we should never for any condition of heterophoria, strabismus or paralysis perform any tenotomy after the manner thus described. We should never operate in such a manner as to disable our muscle in its function of effectually rotating the eye.

We are told of tenotomies which are so far in excess as, after the relaxation, for example, of a single external rectus, to leave the patient with homonymous diplopia for some months. It is true that single vision may, in some instances, return and that even a condition of exophoria may succeed, but if the ability to rotate that eye well to the temple has been lost at the moment of the operation, it is not likely to return without a readjustment of its insertion. Let us impress this important fact upon the mind of every one who operates for heterophoria that whatever may happen in regard to phorometric indications, the rotation of an eye after tenotomy does not undergo any very important change and that we cannot at the time of the operation disable this function in the expectation that the tendon will readjust itself. We should never attempt a complete and final correction on a single lateral muscle. If we have even a low degree of heterophoria, we should proceed on the assumption that, when we have finished the work, we shall have relaxed the lateral muscle of one eye exactly or as nearly exactly as we are able to determine, as much as we have that of the other. There is an important consideration, too often overlooked in operations for hyperphoria and especially for hypertropia, that the gaze of the great majority of our patients must be habitually directed downward. Hence a tenotomy of an inferior rectus is, as a rule, to be avoided, unless there are positive indications for selecting that muscle Should a correction for a considerable degree of hyperphoria or of hypertropia be required, the correction should of course, be divided between the superior rectus of one eye and the inferior rectus of the other. The statement above applies to the cases especially in which only a moderate relaxation is required.

Considerable restriction of the upward rotation is to be avoided on the one hand and a turning of the axes of the eyes upward on the other.

Before any operation, even in well defined cases, more than one, and usually many, examinations should be made. Prismatic glasses, usually less than a nominal correction of the manifest heterophoria, should be given and the patient should be charged to use them continuously during waking hours. From time to time, during the use of these glasses, examinations may indicate a greater degree of defect than was at first found and the prisms may be strengthened. The use of temporary prisms which are kept by the oculist, as suggested by me some years ago, has now become somewhat general. After a time, varying from a few days to a few weeks, we have either found such a degree of heterophoria as would be all that we might reasonably expect to relieve by a single operation without risking a restriction of the rotating power of the muscle operated upon, or there has been a halt in the further manifestation of heterophoria. We may now proceed with an operation, if such a course is chosen. I have already more than once described this operation, but I will venture to do so again in order to introduce some details concerning inquiries which have often been made.

Let us suppose the operation to be done for esophoria and that we have determined to do a graduated tenotomy of the right internal rectus.

The speculum being in place, the patient directs both eyes well to the right. The surgeon takes with his fine forceps a minute fold of conjunctiva at the center of insertion of the tendon. Drawing the little fold of conjunctiva slightly away from the eyeball, with the extreme points of his tenotomy scissors he snips the fold transversely so that an opening about one-half a millimetre in extent is made through the membrane. Now the forceps, the points being closed, is pressed into the little opening and slightly backwards, when the points are permitted to spring apart, after which they are again closed, this time holding a small fold of the tendon just behind the insertion. This little fold of tendon being put on the stretch, the fine pointed scissors, by little snips dissects the tendon from the eyeball between the layers of the capsule (which should remain intact) toward one border of the insertion. The sense of feeling of the fingers against the rings of the scissors will, in the hands of one skilled in this operation, inform him of his approach to the border and warn him against its destruction. In extreme cases, like strabismus, the surgeon may determine to continue his section through the border,

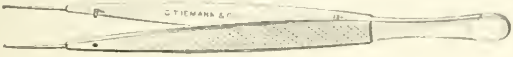

FIG. 1.

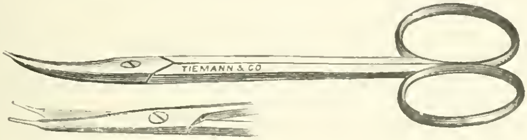

FIG. 2.

leaving uninjured as far as possible both the anterior and posterior lamillae of the capsule, as well as the expansion at each border, to hold the muscle in its relation to the eye. Turning the scissors then in the direction of the other border, this portion is dissected with equal care.

With as little delay as possible, the patient is placed in the examination chair and the test by the phorometer and by prisms is made. It is safe in very moderate cases, by the first operation to carry the correction to 0° and the abduction to 10° or 11°; for at the moment there is likely to be a greater nervous relaxation than will be found an hour or more later, and it may be reasonably expected that, within a few days, there will still be a manifest esophoria sufficient, especially if the temporary prisms are again brought into use, to permit of a relaxation of the corresponding muscle of the left eye equal to that now being done on the right. Such an extent of relaxation may however, be contraindicated, should it be found that the rotation, which should always be tested, before the patient leaves the operating chair, is in danger of being unduly restricted.

Perhaps we find that esophoria is still manifest. The patient returns to the operating chair when the surgeon, introducing the slender blunt hook, feels for the point to which the section has been made, either above or below. He soon finds, if he is expert, whether the section has been carried far enough in that particular direction, and if so, he searches at the other extremity. If he now finds room for carrying the section further, he, using the slender hook as a guide, increases the effect of the tenotomy by carefully executed snips of the scissors; and after an examination this process may be renewed if required.

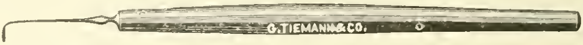

Fig. 3.

If by chance we find that we have erred in judgement and have gained an exophoria with abduction exceeding 11°, we must at once introduce at the exact center of the free end of the tendon a very delicate suture, carrying it through the cut edge of the conjunctiva at the corneal side. There is an occasional exception to this rule in which, if we permit the patient to wait an hour or less, the exophoria and excessive abduction disappears spontaneously. We make this suture to include as little as possible of either tissue, and then draw it with great care until we have overcome the exophoria, as shown by the phorometer, when the knot may be made fast. This process although sometimes demanded in the practice of the most skilful is always unfortunate. Those who tell us that we should cut the tendon across and then introduce the suture are, I am sure, in error.

Should it be found on the following day that the result is not what could be desired, the suture may be renewed or by its removal an increased effect of the original operation may be obtained.

There are conditions which render it almost imperative, in a certain small proportion of cases to make adjustments in lateral tendencies which, although not more than nominally correct at the time of making, are such that the experienced surgeon feels almost sure that, when he is better able to adjust for a supposed hyperphoric condition, they will at length prove over corrections. Such over corrections when they become manifest must be restored to equilibrium. Now it should be an axiom, a rule never to be forgotten, that we have no right in any case to weaken a muscle because we or some one else has weakened the opponent of that muscle. For example, if, as a result of a tenotomy of the internus of one eye, we have an exophoria of even as little as a single degree, it is inexcusable to cut the externus in order to relax that muscle equally with the excess of relaxation of the other.

Let us repeat, we are not to correct an over correction by a new tenotomy.

In all such over corrections, we should resort to tendon shortening or tendon advancement of that tendon which has been too freely relaxed. If the original tenotomy has been done in the manner I have just described, there will be little difficulty in performing a correction which shall leave no cicatricial bands to interfere with the freest action of the muscle.

We begin in this operation, as in that for tenotomy, by making a transverse slit of one-half millimetre in extent over the point of insertion of the tendon. Then, lifting the border toward the cornea by the fine forceps, a little pocket is made by the points of the scissors, extending under the conjunctiva more or less towards the cornea in proportion to the greater or less effect which we propose to induce. The pocket having been made, the forceps seize the central portion or the tendon and it is dissected from the eyeball entirely or partially, as the case may be. If it is entirely dissected, then by means of the lance probe, the tendon should be absolutely freed from any attachment to the surrounding tissues. The fine tendon crochet now catches it at the centre and a little behind the section and draws it forward, or if the hook proves to be ineffectual to hold it during the next stages of the operation, the fine fixation forceps with catch may be used The tendon is drawn forward through the little conjunctival opening when one of the needles

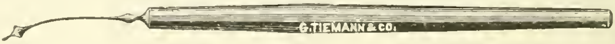

Fig. 4.

Fig. 5.

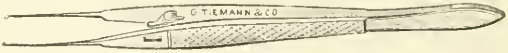

Fig. 6.

from a thread of silk armed at each end with a needle is passed through the central part from one-half to a full millimetre, or even more, behind the cut extremity. Bringing the needle forward until the two extremities of this thread are about equal in length, an assistant carries the lance probe into the pocket already made, and one of the needles, passing by the side of this probe, which acts as a guide, is made to penetrate the conjunctiva at the extreme end of the pocket and the thread is drawn through. The other needle and its thread are managed in like manner, the second needle penetrating a little to one side of the first in order to allow, between the two threads, a little bridge of tissue. Now, the assistant holding the conjunctiva at the border of the wound by means of fine forceps, the surgeon draws upon the ends of the thread, forcing the cut end of the tendon into the pocket, and when he has thus advanced it to his satisfaction, he fastens the threads by tying them across the little bridge.

No cover and no special care is required beyond that needed for perfect cleanliness, and on the third or fourth day the suture may be removed. The greatest danger in these cases arises from the use by the patient of a soiled handkerchief with which he rubs the eye. Against this danger the strictest injunctions are to be enforced.

This operation, with such modifications as may be required, I have performed during the past five or six years in many hundred cases, and it has been witnessed by some scores of my colleagues.

## DISCUSSION ON HETEROPHORIA.

Dr. Burnett, of Washington, D. C.: In view of what has been already said in this discussion, it does not seem necessary to insist upon the importance of muscular errors in the production of symptoms referable to the eyes, head and even remote localities, as due to these defects. Probably no one present now doubts the existence of grave muscular errors and the necessity for their correction.

The problems before us then would seem to be as to the best and readiest method for their detection, the muscle or muscles involved, their extent of involment, and the treatment necessary for relief. And the further we go into the study of the question the more complicated it becomes in all these particulars. Formerly the dot and line test of Gräfe, was considered all that was necessary for determining muscular insufficiencies, but now no one of a half dozen or more methods is deemed infallible, and in some cases all seem to fail, and it is only by the exercise of great patience that the absolute power of the muscles involved can be determined, if at all. I would dwell more particularly upon the difficulties in determining hyperphoria. As we know from the teachings of our physiologists, the interni and externi move the visual axes in what is approximately a horizontal plane. Their simple action gives no vertical or rotatory motion to the eye-ball. So the problem of exophoria and esophoria pure and simple is a comparatively easy one.

We should give attention to the remark of Dr. Stevens, that a complete tenotomy of the internus for example might, by a faulty union, give rise to a pathologic rotation of the eye. This he did not think was so liable to happen, if the muscle was allowed to go free as when it was sutured. But if that is to be feared so much as the result of the operation, how much more should we consider its possibility as a primary condition. We must remember that the upward and downward movement of the eye is an exceedingly complicated one and is not made by one set of muscles alone The superior and inferior recti and the obliques which make these movements, have also a lateral and a rotating movement each, and as the recti and obliques are antagonistic in this portion of their action, we should in every case of hyperphoria be able to put our finger on the faulty muscle. If we cannot, our therapeutics, whatever it may be, must be, in a measure, blind. So far as I am aware no effort has yet been made to detect and measure this error in rotation in hyperphoria, and yet it must exist in some degree in every case, and it will be different according as the obliques or recti are involved. There is every reason for supposing that the effort on the part of the eye to evercome this faulty rotation, and to bring the planes of the two visual lines into their proper relations with each other lies at the bottom of the trouble in hyperphoria quite as much as the vertical deviation. And it probably also accounts, in no small degree, for the unsatisfactoriness of the vertical diplopia test, which we find mentioned not infrequently. It is fortunate, however, that, as far as surgical therapeutics goes, there is this correlation in the action of the recti and obliques, for it will enable us when an error in an oblique is clearly diagnosticated to correct it by an operation on the associated rectus. My friend Dr. Savage is the only one who seems to be working on these lines, and I hope his sanguine expectations may be realized.

Two years ago I reported, to the Ophthalmological Society, my experience in tenotomies and from the favorable opinions then expressed I have had, from my further experience, no reason to recede.

Dr. Gould, of Philadelphia: According to Dr. Burnett, who undoubtedly represents the general consensus of feeling of ophthalmologists, the well recognized treatment in decided cases of heterophoria is that of tenotomy, either partial or complete, according to the circumstances. This to me seems to be a true tenotomomania, and one illustration of the general surgical debauch of these days, which has also been so well illustrated in gynecology. It should be remembered that surgery is not medicine, that it is the despair of medicine, and a *dernier ressort*. The true physician only proceeds to surgery when medicine is no longer able to bring relief. I believe that in a very few years from the present time there will be little, or no, tenotomy in cases of insufficiency of the extra-ocular muscles. I protest that the whole muscle question is not a muscle question at all: that the origin of the trouble is not in any peripheral organic defect, but that it is almost entirely of a central origin or nature, and that it is functional and not organic. A large number of cases, of course, are to be set aside as due to general disease and abnormal conditions existing in other parts of the system. If this is the true view the cure must therefore be a cure, not of the peripheral organs, which are not at fault, but of the nerve centers controlling the extra-ocular muscles, because in uncomplicated cases the disease is a disease, if it may be so-called, of the nerve centers and not of the muscles themselves.

I especially remember a case in which there were 18 degrees of esophoria The patient was operated upon, the tendons of both internal recti being completely severed, producing temporarily slight exophoria. To the astonishment of the surgeon the original condition was reinstated within ten days, and the patient's original 18 degrees of esophoria had completely returned. If such a result as this could arise (and the speaker contended that there was a tremendously large element of doubt as regarded the results of operation upon the muscles of the eyes) what then could be said as regards the infinitesimal delicacy and minutiæ of operations when surgeons speak of correcting half a degree, or one or two or three degrees of heterophoria of any kind? Such a result also conclusively proved that it was not a case of peripheral lesion, but that the trouble lay in the central nerve-system.

The essence of the diagnosis consists in normality of adduction power and in the relation between abduction and adduction. Leaving out cases of heterophoria, if we have adduction of 25 or 35 degrees, and abduction of from 4 to 8 degrees, there is certainly no insufficiency and no demand for interference with the muscles of the eye The secret of the whole matter is to reinstate such a proper relation between adduction and abduction. Every case of heterophoria not traceable to general disease, malnutrition, ametropia, etc., I believe to be curable without any operative interference, by a course of gymnastic exercise with the object of developing the strength of the innervational centers. In all other cases of incordination of the muscles of the body we do not cut a strong muscle or group of muscles in order to strengthen a weak muscle or group of muscles; but instead of that we endeavor to develop the strength of the weaker function. And so in heterophoria, the true therapeutic measure is to develop the weak adduction power.

I have discovered by experiment a method of developing this weak adduction power which I believe might be of service, and which has proved very successful in my hands during the last year. In all cases of insufficiency that have not proceeded so far as strabismus, there is during convergence singleness of the images in vision, and an increased ability or strength of the coördinating muscles brought into play. The problem, then, simply consists in carrying the power developed at the near point of vision to the far point; in other words, of so developing the nerve-centers that the stimulus of converging power shall be enlarged until the same power exists in distant vision To illustrate the method I might cite a number of cases in which there was exophoria at 20 feet of from 5 to 15 degrees, and adducting power of from 10 to 20 degrees only, and an abducting power somewhat in excess of that needed. By placing prisms before the eyes, bases out, twice as powerful as the patient could fuse at 20 feet, and beginning with the stimulus of convergence at the near point, the objet could be very soon carried beyond the near point without producing diplopia, and in a very brief period of time the internal-recti muscles had gained their normal strength, the adducting power had increased to 30 or 35 degrees, and the reflex symptoms had entirely disappeared. I could cite a number of cases of this kind in which the cure has been brought about within a few weeks in young people; and in the more neurasthenic or older patients, if the insufficiency had not been made to entirely disappear, there was a great improvement in this respect, which was first demonstrated by the disappearance of the reflex symptoms. As the weak muscles regain their power, stronger prisms may be used, and there is a perfect coördination and proper relation between adduction and abduction.

It would seem therefore that as conservative and wise physicians we should not longer indulge in this glamor of surgical procedure, but, with more conservatism, we should seek to remedy defects by physiological and medical methods rather than by surgical methods. The success that has attended practice of this plan during the last eight months has been so remarkable as to convince me that the method of carrying the convergence stimulus into the distant vision, and the developing of the weak nerve-centers is the true and rational method of procedure in these cases.

Dr. Savage, of Nashville:

I am exceedingly sorry that Dr. Stevens is not here, since it is my purpose to controvert some of the thoughts set forth by him in his discussion this morning. I agree with him in many of the views that he holds; but I consider that he is wrong in his teaching as to some very important practical points.

I agree with him that, associated with muscle errors and depending on them, there are peculiar facial expressions. I wish I was as able to interpret these as he is. But he stated that sometimes the facial expression clearly indicates the existence of a certain muscle error which is not at once shown by the tests at our command. In connection with that statement he did not tell us his method of dealing with these cases. We may reasonably infer from what he said further on in his discussion that, the facial expression having indicated a hyperphoria but not finding this with his phorometer, he at once institutes steps for making manifest a latent hyperphoria, doing this by means of prisms in position of rest for the suppected weak muscles, of action for the supposed strong muscles. Continuing this for a few days the latent error begins to be manifest; and the tests begin to harmonize with the facial expression.

I believe the facial expression may sometimes be misleading, and that, as an index to a muscle error, it can be proven false or true by our muscle tests. I believe further that means should never be resorted to, under any circumstances, for making manifest any supposed latent error If we have a "hint" that we are about to deal with a left hyperphoria and a right cataphoria, it is clear to my mind that we should direct our efforts towards curing the slight manifest error, rather than add to it by bringing out a latent error. If a prism be placed base down before the left eye and another prism base up before the right eye, in the supposed case, the strong muscles will be made stronger and the weak muscles weaker, in comparison. This work could be carried on, up to a certain point, and thus a greater or less quantity of a supposed latent error may be made manifest. How much better it would be to reverse the order and make it possible for the error already manifest to become latent by being cured. Place the prisms in positions to strengthen the weak muscles, regulate the exercise as to intensity and time, and they will grow strong. The only object we could have in view in increasing the hyperphoria is that a sufficient quantity may be shown to justify operative interference. This seems to me to be a very round-about way to effect a muscle balance; and I believe it to be a very incorrect method. If one believes that operations alone can correct muscle errors, then he must of necessity often resort to the work of making manifest much that is latent, so that an operation might be indicated.

I must dissent from another thought which Dr. Stevens emphasized this morning. He plainly stated that he did not believe that the accommodation has anything to do in the way of causing or curing any form of muscle error. In this I believe him to be wrong, so far as the lateral muscles are concerned. As evidence, I want to introduce one of his own cases. A few years ago, in one of his publications, he gave the history of a patient who, when a little girl, had an internal squint; later in life there developed a slight deviation outward, but now on instilling atropine she suddenly developed her old internal squint. He published a picture of this patient representing her as a little girl with an internal squint: also a picture representing her as a woman approaching middle life, with eyes comparatively straight; and still another picture showing the same woman, at the same age, under the influence of atropine which had excited a high degree of internal strabismus. He states that the squint disappeared when the effect of the atropine passed away. Having had patients like this one, I am sure I do not err in the statement that she was hypermetropic, though the Doctor's report did not give her refraction. Early in life, when she had full ciliary power, the activity of the centers controlling the ciliary muscles excited a tendency to activity in the centers controlling the converging muscles that could not be restrained by the guiding sensation, and one eye turned in. Later on the ciliary muscles having lost much of their power, the centers controlling these became less active and correspondingly there was less excitation of the converging centers, so that the guiding sensation again assumed control of the internal recti, the squint disappearing simultaneously. Atropine suspended what ciliary power remained and, as a consequence, very imperfect images were formed on the retinæ. The guiding sensation not being satisfied with these images called on the accommodative centers for help. In response to the call, these centers generated an impulse and sent it out to the ciliary muscles but they were not aroused. Another complaint went from the guiding sensation, more urgent than before, and by it a greater degree of activity was axcited in the accommodative centers: but every impulse, though increased in intensity, found the ciliary muscle unresponsive. In this manner the calls and responses were kept up from hour to hour. This activity of the accommodative centers was attended by a corresponding tendency to activity on the part of the converging centers, which tendency, having thrown off the restraining influence of the guiding sensation, became unrestrained action, developing the internal squint. As demands on the accommodative centers ceased, the unusual excitation of the converging centers passed away, and with it the muscles again became obedient to the restraining commands of the guiding sensation and the squint was no more. I have had numbers of just such cases and have often amused myself by satisfying the guiding sensation with sharp images by placing correctly centered lenses before the eyes, when, as if by magic, the squint would disappear only to appear again the moment the glasses were raised. For this there can be but one explanation: the sharp images (made so by the lenses) satisfied the guiding sensation which instantly ceased its calls on the centers of accommodation, and as a consequence both the centers of accommodation and convergence became quiet. We need no stronger evidence that the centers of accommodation have the power of changing the "balance" between the external and internal recti muscles. If this relationship can develop a squint, certainly it can cause an esophoria which is a "latent squint". If glasses properly centered can cause a squint to vanish, is it incredible that glasses can cure an esophoria which depends for its existence on an uncorrected hypermetropia? In a recent publication, I have termed this a pseudo-esophoria and distinguished it from intrinsic esophoria which cannot be cured by convex lenses. The two may be associated in a case of uncorrected hypermetropia, while the intrinsic form can alone exist in cases of emmetropia and myopia —In volume II number 11 of the *Ophthalmic Record*, this whole subject is dealt with at length.

While glasses have the power when properly adjusted and accurately centered, to cure some pseudo-muscle errors, they have no power at all over intrinsic heterophoric conditions. With pseudo-errors may be classed those muscle anomalies dependent on decentration of the maculæ, which variety can be cured and ought to be cured by prisms in position of rest, or, what is the same thing, by decentered lenses.

Since focal corrections can do nothing for the cure of intrinsic muscle errors, and since prisms in position of rest should never be prescribed for a correction of these errors, the question naturally arises " what shall we do for their relief?" There are two plans of treatment each appropriate in its place: Rhythmic Exercise for developing the weak muscles; operations, partial tenotomies, for weakening the strong muscles, and shortenings for giving greater power to the weak muscles. The indications for the one or the other are clear to my mind, and my practice is governed by these indications.

When there is exophoria of any quantity in the near, but none in the far, the case does not admit of operation. The plan of Rhythmic Exercise which I have introduced will cure the exophoria in the near and allow orthophoria for distance to remain An operation in such a case would give as much esophoria in the distance as it cures exophoria in the near, therefore it should not be thought of.

Again, when there is esophoria for distance and orthophoria in the near, the error for distance can be cured by gymnastic exercise, allowing the orthophoria in the near to remain. An operation would give as much exophoria in the near as it cures esophoria in the far, therefore it should not be done.

A hyperphoria of less than 2° should be cured by gymnastic exercise.

When there is exophoria both in the far and near, that for distance should be corrected by a partial tenotomy of one or both external recti; and later the exophoria remaining in the near should be cured by developing the internal recti by exercise.

When there is esophoria both in the near and the far, that in the near should be relieved by operating on one or both internal recti, and the esophoria remaining in the distance should be cured by developing the external recti by exercise.

When there is hyperphoria of more than 2° an operation on the tendon of the superior rectus should be done to effect a part of its cure. Rather than over-correct, it is far better to fall short of a full correction, and cure the remaining part by developing the weak muscles by rhythmic exercise.

No muscle should be operated on but once. If an exophoria for distance cannot be corrected by a partial division of the tendon of each enternal rectus, the balance should be accomplished by shortening one or both internal recti. Reversing the order, the same course should be pursued in very high grades of esophoria. In no case of heterophoria should the tenotomy be complete.

If in a high grade of hyperphoria there should be more than 2° of the orror after a partial tenotomy has been done on the strong superior rectus,a similar operation should be done on the strong inferior rectus of the fellow eye Shortening or advancing a superior or inferior rectus will not often be necessary. I have never seen a case requiring it.

When I am about to operate I decide before-hand what I want to accomplish, and do what I undertake without resorting to tests during the operation. I always aim in exophoria and esophoria to divide the effect between the corresponding muscles of the two eyes, but, as a rule, do not operate on the second muscle within four weeks. Not infrequently I find that my first operation has accomplished all I desired. Never has the first, and in only two instances has the second, operation accomplished more than I wanted, and my operations run up into the thousands. Before devising the rhythmic exercise treatment I did desire, not being able to do better, to give by my operation some esophoria for distance in relieving some of the exophoria in the near, and *vice versa.* I make the division of the capsule co-extensive with that of the tendon.

With Dr. Gould I agree that unnecessary operations have been done on the ocular muscles, and that bad results have followed, all of which is to be regretted. These errors can be, and should be, avoided. The fact that bad results have been seen should not and, I dare say, will not drive all thinking men from acting on sound principles. These operations cannot be called "surgical debauchery" when carefully and skillfully done. There is nothing under the sun more sure than that there are intrinsic errors of the ocular muscles, errors the nature of which may be clearly understood, errors that cannot be cured by any and all medical means at our command or that may be at our command in the future. Even glasses, purely surgical appliances, cannot alter the true nature of inherent muscle troubles. Glasses and medicines, I grant, may so act on the nervous system as to make these errors more tolerable, at least for a time. But the errors are there still in spite of all these means. As they can be made more tolerable by improved systemic conditions, they can, on the contrairy, be rendered less tolerable by systemic derangements and extraneous causes that disturb mental equilibrium. The fact remains, and will always remain, that intrinsic muscle errors—errors due to hyperdevelopment of the too powerful muscles, or to a more favorable attachment of these muscles to the globe, or to their having inherently and persistently a too abundant nerve supply—can be *cured* by only one of two means, both surgical in their nature: first, operations on the strong muscles; second, development of the weak muscles by proper gymnastic exercise. The indications for the one or the other of these, or for both combined, are clear in most cases. Surgery is not the *despair* of medicine, but medicine's *hope*. As to ocular troubles, medicine does not appeal to surgery in vain. The two forms of ocular surgery, applicable to the ocular muscles, will go locked hand-in-hand down the ages, each to do its own proper work and ever ready to call on the other for aid in time of need. No, the days of well-done partial tenotomies are not over, nor will they end with the hundredth generation of oculists to follow us.

Dr. Risley, of Philadelphia: Dr. Stevens remarked that heterophorias declared themselves in the facial expression of his patients. I am sure that those who devote themselves to the study of this complicated and intricate subject must, sooner or later, exhibit the results in their anxious and haggard faces. The gentleman who preceded me has been preserved from the grey hairs, so numerous in the section, by the bouyant faith in his method. For my part the gloved hand of conservatism is controlling more and more my management of the errors of muscular balance. While the careful study of the relations between convergence and accommodation is of great importance, no study of these cases is complete which does not take for its starting point the etiology. The proper dynamic relation between the interni and externi is 3 to 1, determined at 6 m. This is based upon the careful study of a very large group of corrected eyes in which no muscular anomaly existed, and asthenopia was absent. When this relation does not obtain error of muscular balance may be assumed.

The etiology of such disturbance is important and should control the management of the case. Some cases are unquestionably congenital, and possibly due to errors of development: in others seen in adult life, the esophoria is a residuum of periodical converging strabismus in childhood. This could in some cases be demonstrated by the study of photographs taken in childhood. Foreign irritation is not infrequently the cause of trouble in ocular muscles. I could relate the history of a case in which a pessary removed the heterophoria, which had seemed to require tenotomy. The ocular muscles are subject to disturbance by general diatheses, as are the other muscles of the body—syphilis, rheumatism, gout, etc.; and a heterophoria might therefore be due to a rheumatism of one of the muscles or the residuum of a palsy. It is probable that a muscle once the subject of a palsy, whether peripheral or central, never entirely recovers its original efficiency.

Disturbance in ocular balance is often the initial symptom in tabes: or disease at the origin of one or more of the nerves supplying the ocular muscles, and error is very liable to creep in at this point. I can not agree with the dictum of Dr.

Stevens, regarding refractive errors in relation to muscular trouble; in my judgment the two are inseperable in that group of cases of peripheral origin.

Dr. Baker, of Cleveland, Ohio:

I think Dr. Gould will have little occasion to regret his strong condemnation of the promiscuous snipping and cutting of the tendons of the ocular muscles, now indulged in by certain ophthalmic surgeons. For many years we have been endeavoring to so perfect our means of correcting errors of refraction as to be able to cure cases of strabismus without resorting to tenotomies, and now that we have about succeeded in curing most of these cases, without operative interference, in which there is a positive rational indication for operation, these fellows come along and tell us that we must operate in every case where there is the slightest deviation. I believe division of the tendons in most cases to be unnecessary: and I think partial tenotomies unscientific and unsuccessful; that a partial tenotomy eventually shortens instead of elongates the tendon. When a tenotomy is performed, a complete devision of the muscle should be made and controlled by a suture if necessary.

Dr. Woods, of Baltimore, said:

The entire discussion seems to point to the fact that the oculist, in treating heterophoria, must remember that he is a *Doctor*: that he is investigating a condition, sometimes troublesome, sometimes not: sometimes intrinsic, sometimes secondary: that the primary cause is sometimes in the eye, sometimes elsewhere. As Dr. Burnett has said, we are to look into the itiology. If we are not capable ourselves of meeting the remote conditions, we should seek help rather than do a doubtful operation. Dr. Risley has, I think, given, as nearly as they can be given just now, the correct principles. I have had a case similar to to the one he mentioned:—A young woman, employed in a store, whose head and eyes pained almost constantly. Correction of Mas. against the rule failed to relieve her, as did prismatic correction of an exophoria. An operation to remove a uterine defect and some menstrual disturbance cured her—eyes and all. I have a patient, a lady, who does a great deal of eye work, and who for several years has obtained relief from headaches by wearing cylinders: yet she has a hyperphoria of 2½°. Surgical interference in these cases would have been bad: in the first, it could not have reached the real cause; in the second, there could be no reason for correcting a "tendency" which was doing no harm. On the other hand, when the heterophoria is intrinsic and really causing the disturbance, results are brilliant. The gratitude of patients thus relieved, shows what great good can be done. The question is to determine *what* cases need operation.

There are a few points in the papers of the morning and the remarks made at this session about which I should like to say a word. Dr. Stevens advice for journal writers to give all the details of a case, in reporting, and not simply say "such and such an error of so many degrees," should be followed. Such reports of cases, in the present state of heterophoria, are useless. I wish very much Dr. Stevens were here this afternoon to explain why correcting glasses should not be worn during the muscular examination, as he stated this morning. This contradicts all his former teachings, so far as I know, and opposes all the recognized principles of refraction. According to my way of thinking, an examination of the muscles without refraction correction would be useless.

Dr. Savage has said he "would develop the interni out of a near exophoria." and "would correct an esophoria up to its amount at the near." If the principles I advocated in my paper this morning are correct the former might be a normal condition, and it might indicate either a hypersthenic or weak ciliary muscle. The clinical significance of the esophoria at the near would depend entirely on what had been found at 20 feet. If more esophoria, how much more? I do not believe that any valuable information about the intrinsic strength of the recti muscles is to be gotten from the *near* equilbrium. This is gotten at 20°, and the near test is made for an entirely different purpose.

It seems to me Dr. Risley has under-estimated the normal proportion of adduction to abduction. I am inclined to think it is more frequently 5 or 6 to 1, than 3 to 1.

The cross shown by Dr. Zeigler this morning for the near test seems to me too large to bring out exact accommodation. The smaller the object the better. Again, it should be mounted on some sort of a rod which would keep it at a fixed and definite distance from the eye.

DR. ZEIGLER, of Philadelphia:

I heartily agree with what Dr. Woods has said in regard to the inter-relation of the distance and near test. This is illustrated by an anomalous case I related in which the esophoria for near was 6° while for far it was only 2°. I was compelled to bring the eye to orthophoria for near, with the accompanying transfer to exophoria of 4° for distance, before I could secure comfort in near work.

I do not find that the record of muscular power bears any important relation to either operative or prismatic correction of heterophoria, although we should have an accurate knowledge of it for other purposes.

Dr. Stevens, I believe, said that he did not believe in the statement that the ciliary muscle may disturb the condition of the extrinsic muscles of the eye-ball. I think we have all seen temporary heterophoria from ciliary spasm, and per contra ciliary spasm from functional muscular errors. The relation between accommodation and convergence is certainly an intimate one. Relying on this fact, I always adjust the proper constant correction in my trial frame and place in front of patients eyes in both operative and non-overative cases. In fact a test with and without the refractive correction will show different results; just as a test under mydriatic is only a matter of interest, and not to be relied on because the accommodation is suspended.

Dr. Stevens referred to a case in which I overcorrected the exophoria 5°. It was a case of esophoria of 20° reduced to orthophoria by total tenotomy, which had receded to 10° base out. A complete tenotomy was made on the internal rectus of the other eye over-correcting 10°, and again it slid back coming to orthophoria or 1° beyond I think the history of this and similar cases justified me in doing as I did; and five months of comfort for the patient goes to prove the same.

In regard to advancements I prefer the capsular advancement, in heterophoria, and the muscular advancement in heterotropia or squint. To get the best effect in the latter cases the adhesions should not be loosened but drawn up with the muscle in order to get the best effect

In regard to failure to correct cases of internal squint: I think we frequently overlook the capsular adhesions, which when cut may allow the eye to turn from 5° to 10°. They practically amount to a shortening of the muscle.

I think we all use muscular gymnastics, with great relief in some cases, and none in others.

I agree with Dr. Risley in regard to uterine irritations. I remember a very hopeless case of heterophoria in a woman whom I referred to a gynecologist, and was wholly relieved by an ovarian operation.

Replying to Dr. Woods I would say that I have generally used a smaller cross for the near test, but the engraver has made an error in making this large cross. The card I presented is the first proof. I do not however hold the near test-object at a single point, but take the range.

# A SCALE FOR THE SPEEDY AND ACCURATE DETERMINATION OF THE ANOMALIES OF OCULAR MUSCLES.

Written for the Ophthalmic Record by

J. FREDERICK HERBERT, M.D.,

PHILADELPHIA, PA.

The scale consists of a black background with ten white squares each to the right, left, up and down from a central square thus forming a cross, each block being one centimeter square, and so arranged that the separation of each square is equivalent to a deflection of a *prism dioptry.*

The scale is based on the excellent suggestion of the prism dioptry as originally pointed out by Mr. Chas. F. Prentice, in the Archives of Ophthalmology Vol. xix, No. 1, p. 64.

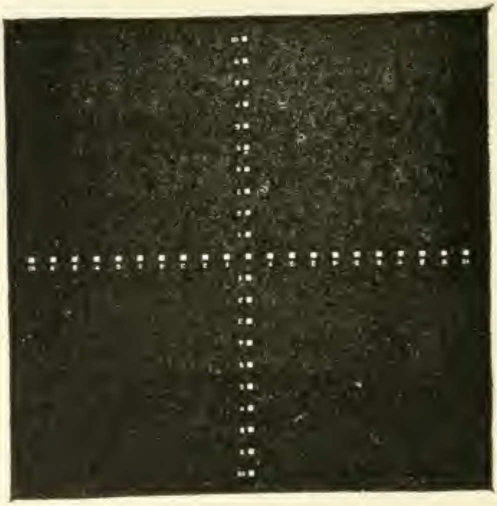

Fig. 1.

If the tests are to be made at a distance of five meters, the squares *must* be five centimeters apart, that is, from the center of one to the center of the other, if however that distance is not convenient, any other may be chosen the rule being that for every decrease of one meter the distance of the squares must be approximated one centimeter and for every increase of one meter the squares must be separated one centimeter for each additional meter.

Figure I illustrates the scale, the squares can be painted on an ordinary blackboard, or on a rubber cloth, or card-board could be substituted (white squares can be cemented on black, or black squares on a white, background).

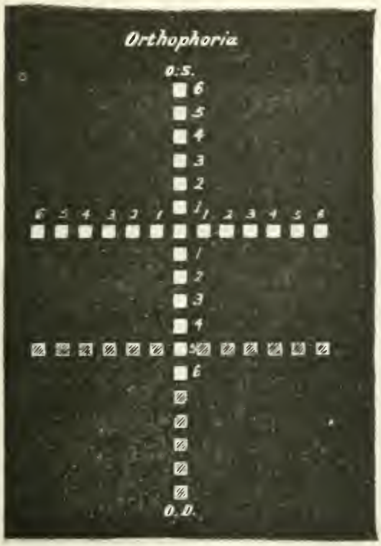

Fig. 2.

The scale can be hung up in a *good light*, opposite a window f possible and the center of the scale should be on the same evel as the patients eyes.

I myself prefer to use the scale in a darkened room and cover he central spot with a small point of light. A candle can be used for this purpose, but it is not as satisfactory as a small gas-jet. The candle as it burns down must be changed so that the flame s always directly over and in front of the center, whereas a gas burner can be arranged permanently and, for convenience, an electrical attachment may be added to light and turn off the gas at pleasure.

By placing a 5° prism dioptry lens in a trial frame in front of O. D. the cross consisting of the squares will be deflected downward five squares, and if there be *orthophoria* in the vertical meridian, the cross will only have one vertical set of spuares, but there will be two horizontal arms as shown in Fig. II.*

The same of course is true in testing for horizontal diplopia In this case the *base* of the prism must be placed either *inward* or *outward*; if there be orthophoria in this meridian there will be but one horizontal arm and two vertical arms. In orthophoria the separation of the arms always equals the strength of the prism used.

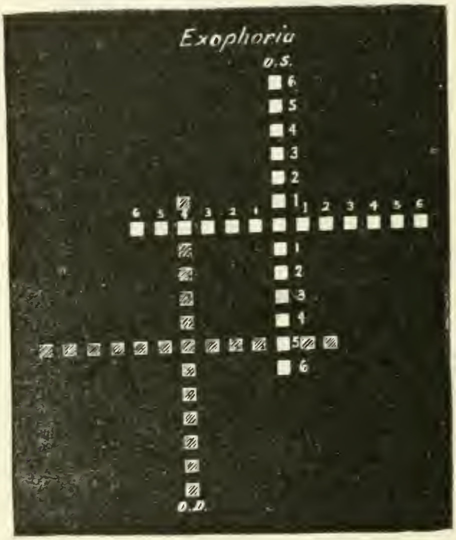

Fig. 3.

If heterophoria exists it can be detected instantly and not only the kind, but also the amount can be read off at once. Having the 5° P. D. *base up* in front of O. D., the patient tells you that one cross is five dots below the other and passing through the fourth button to the left, then you have a case of *exophoria* of 4° (see Fig. III); if to the right it would be a case of *esophoria*, the amount depending on the deflection, one degree P. D. for each square displaced.

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* The scale as seen by O. S. is made up of solid white squares, and the image belonging to O. D. which is deflected by a prism, is made up of shaded squares—the former is called the primary and the latter the secondary image.

In testing for *hyperphoria*, you deflect the cross either to the right or to the left, and the relative position of the secondary set of squares to that of the primary will give you the amount. Fig. IV shows a case of *right hyperphoria* of 3° P. D. (5° P. D. lens *base in*, in front of O. D.)

Hyper-exophoria and hyper-esophoria can be detected in the same manner, by reading scale and making deduction of prism used. Should the heterophoria be more than 10° P. D. a partial correcting prism can be slipped into the trial frame and the amount of same can be added to final result.

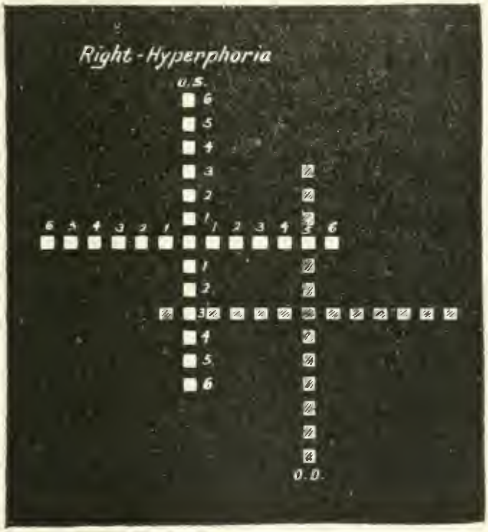

Fig. 4.

I find that "Stevens Phorometer" is an excellent instrument to use in conjunction with the scale, as one confirms the readings of the other. *The Phorometer* consists essentially of two prisms so placed that when they are adjusted, base *up* for O. D. and base *down* for O. S., any deviation in the vertical meridian can be seen at once: and if there are two images (or two crosses if using my scale) the lower to the left, then there is *exophoria*; and by rotating the prisms to the left until one image (or cross) is immediately beneath that of the other, the degree of the insufficiency read off by the pointer on the arc of the instrument, it will be found that the reading will agree with the primary deviation on the scale. The same of course is true for *esophoria*, only that the secondary or lower image would be found to the right, and the prisms must be turned to the right until one is directly above that of the other. When testing for *hyperphoria* the prisms are adjusted base to base and any deflection in the horizontal meridian can be read off in a similar manner.

When a "*Maddox Rod*" is used, the tests are just as easy and simple. Place the rod in a horizontal position before O. D. and if the patient tells you that the streak covers the vertical arm of the cross and then turning the rod to the vertical position it covers the horizontal arm, the case is one of *orthophoria*; if however when the rod is in the first position the streak is seen to the left, say on the 4th. button (similar to Fig. III). you have *exophoria*, of 4°; if streak is to the right it is *esophoria*.

Now change the rod to the second or vertical position and if you get a horizontal streak below, crossing the 3rd. spot, the case is one of *right hyperphoria* (similar to Fig. IV); if streak is seen above, the case is one of *left hyperphoria*. etc., etc. To obtain good results one must have accurate instruments, therefore every ophthalmologist should go over and *test* the *prisms* in his trial case and see that the prisms are marked correctly and if the marking does not correspond to the deflection, they should be marked with their *true value*. My scale can be used as a "*Prismometer*". If you have a 5 meter scale mark off 5 meters and then hold up your prism at this distance, see how much deflection there is, count the number of square's displaced and the result will give you the strength of the prism, if 3 square's you have a 3° P. D., if 4 square's 4° P. D., etc., etc.

If the scale is made exact and the prisms marked accordingly, the results will be perfect, the corrections must come out right. The rule will work both ways: every *prism dioptry* will deflect to amount of one square and every degree of diplopia will be corrected by a prism corresponding to the amount of deviation.

For near tests (at 50 centimeters) use a scale with the dots or squares 1 *mm* in size and 5 *mm* apart.

*Scales* can be obtained from Messrs. Bonschur & Holmes, 1527 Chestnut St.; Messrs Queen & Co., 1010 Chestnut St., or from any of the Optical establishments in Philadelphia.

1313 Arch St., Philadelphia, Pa.

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# AMBLYOPIA.

Written for the Ophthalmic Record by

C. M. HOBBY, M.D., IOWA CITY, IOWA.

In advocating the restriction of the term amblyopia to the imperfect vision found in eyes that have been deprived of perfect retinal images, at the point of fixation, for a considerable period of time (the so called amblyopia exanopsia), I do it because it seems apparent that there is no other form of deficient vision unaccompanied by pathological changes; leaving the question as to such changes in the nerve centers, even in this condition, to be determined hereafter.

In the progress of science the application of the terms "amaurosis" and the more recent "amblyopia," has been gradually restricted, until it seems probable that terms, in general expressing disordered functions, are to be retained only until more careful study and observation show how such disordered functions are caused. Schweigger's remark that "it would be reasoning in a circle to argue from the fact that a considerable number of squinting eyes are amblyopic, that consequently squint is the cause of amblyopia, applies equally well to his argument that amblyopia precedes the squint. However I believe it comes nearer the facts to state the propositions as below.

First. Amblyopia is rarely (I believe never) found, excepting in eyes that have been deprived of perfect retinal images for a considerable time, probably for years.

Second. Where the eye is deprived of the formation of distinct retinal images from birth, for several years, amblyopia always results.

Third. The more imperfect the retinal image, during childhood, the higher the grade of amblyopia.

The only cases found recorded, that appeared to run contrary to the first proposition, were either cases of toxemia or had grave central lesions; so that we may safely consider impairment of vision without history of dis-use, and without evident pathology, as an important symptom of cerebral lesion, or poisoning

In regard to the second position I anticipate some dissent. It is hard to define a perfect retinal image, or to establish a basis for estimate, but if the media are so clear that the minute retinal arteries can be seen by the ophthalmoscope, clearly defined, and no evidence of disease of any of the ocular structures exists, we ought not to allow very wide limits for individual peculiarities. With Snellen's type and $\frac{20}{20}$ for a base we find individuals whose acuteness of vision is as great as $\frac{20}{8}$: and so for convenience we can take $\frac{20}{80}$ for the other extreme, and consider as abnormal or amblyopic, all cases that fail to get $\frac{20}{50}$ with good refractive media properly corrected, and normal retina and disk.

But it is well to keep in mind that failure of vision from non-use is probably a factor in the larger proportion of cases, that, under apparantly normal conditions anatomically, fail to get $\frac{20}{20}$. No case of congenital cataract, and no case of complete dis-use of one eye in infancy, that I have encountered has altogether escaped amblyopia. In squint not all eyes that, at times, are disused become amblyopic, although as a rule they do, even where the error is slight. But that the amblyopia in squint is of similar origin is shown by the fact that where persistent efforts to overcome squint by covering the preferred eye is made, the amblyopia is prevented; and it is also shown by the fact that the younger the patients with squint are examined, the smaller the proportion of cases of amblyopia that are found, and the less the average degree. But not all cases of refractive errors of high degree are accompanied with amblyopia; here habit, surroundings and constitution of the individual become elements in the case; where fixation can be secured and maintained, and contour lines be brought to a focus upon the retina, the function will be maintained. On the one hand the hyperopic astigmatic while using his accommodation on distant objects, preserves a reasonable sharpness of outlines, and this allows the visual acuteness to be developed promptly when correcting glasses are worn: on the other hand when his horizon is restricted by the school room, the accommodation is unequaled by the task, even contours are lost in indefiniteness, effort fails of reward, and amblyopia creeps in. The third proposition of course depends on the acceptance of disuse as a cause, but is evidenced by the fact that the worst forms of amblyopia are those associated with congenital cataract and squint. The best result I have seen in congenital cataract, operated on after five years of age was $\frac{20}{200}$, and about the same result was obtained in six cases (only two of my own) that I have noted. The annexed table shows the visual results obtained in 807 astigmatic eyes, free from disease.

| | Eyes. | S. = $\frac{20}{20}$ or better | $\frac{30}{60}$ or better | $\frac{20}{60}$ or worse |
|---|---|---|---|---|
| Refraction H. | 543 | 343 | 511 | 32 |
| + 1.00 or less | 221 | 82% | 99% | $\frac{7}{10}$% |
| + 1.25 to + 3.00 | 164 | 62% | 96% | 4% |
| Over + 3.00 | 108 | 19% | [illegible]% | 21 |

| | | | | |
|---|---|---|---|---|
| Myopic | 264 | 106 | 128 | 30 |
| — 1.00 or less, | 78 | 70% | 98% | 2% |
| — 1.25 to — 3.00 | 103 | 37% | 91% | 9% |
| More than — 3.00 | 83 | 16% | 77% | 23% |

The mixed cases are included with the others according to predominant character. All of the hyperopic eyes with less than $\frac{20}{60}$ and with less than 2.00 D. of error were dis-used on account of squint. Some misapprehension, in regard to the vision of squinting eyes, has been caused by the use of the term "suppressed images," experiments readily made showing that within certain limits we may direct the mental action to one, the other, or both eyes at will; ability to concentrate the mind upon the image in one eye exists in most people, ready to be cultivated, and this ignoring of an imperfect or less readily used image, constitutes the suppression referred to. In convergent squint the selection of one eye and the drifting in of the other are probably consecutive details of the early history.

If sometimes one eye and sometimes the other be selected for work, ability to fix and correctly recognize objects depends only upon the refractive condition, and with this brought to the normal there should be no difference between the two eyes.

When one eye is used to the exclusion of the other there will be preserved, in the used eye, a maximum of ability for its refractive condition, while the other will diminish gradually in perceptive power, until the vision at the *fovea centralis* becomes reduced to the character of excentric vision; sometimes the vision seems equal for several degrees around the fovea the peripheral vision suffering less or not at all. The ultimate of amblyopia from dis-use is seen in cases of congenital cataract, operated on after ten or twelve years of age, the aphakial but otherwise perfect eye, keeps up its search, constant but ineffective, for a fixing point; and the same association of nystagmus with great amblyopia occurs occasionally in strabismus with extreme refractive error.

What has been supposed to be a secondary point of fixation in a squinting eye, has been described; this is supposed to occur at the point where the image of the object fixed by the non-deviating eye falls upon the retina of the squinting one: habit has accustomed the mind to the location of the object looked at, at this point, but I have been unable to find any increased perception, and any apparent preference for it disappears quickly after operation.

This summary of the cause and development of amblyopia leads at once to the suggestion that all disturbances of vision in childhood shou'd be promptly investigated, and that the attention of the profession at large should be called to the results of neglect of cataract and squint in childhood: that then is the only opportunity to secure good functional results. The tendency to procrastination is so strong that parents welcome the advice of the family physician to postpone efforts at relief. I have repeatedly seen children of ten to fifteen years of age waiting anxiously for the operation they had been assured would restore or rather give them sight, and have eight times operated on such cases, with the best of mechanical results only to find the vision of little use to them.

These views are presented not as new deductions, but to recall the teachings of the old masters, who, while deprived of those instruments of precision which are the pride of modern ophthalmology, yet possessed such powers of observation and deduction as to entitle their work to reverence, and their conclusions to careful comparison with the conclusions arrived at by the aid of modern discoveries.

Wenzel Manuel de L'Oculiste, Paris 1808.

Amaurosis. C'est la même chose que goutte sereine, c'est-à-dire la paralysie du nerf optique etde son expansion (la retine.)

Ambliopie. * * * il sera rejeté lorsque l'affaiblissement de cet organe sera dépendant des maladies qui sont connues sous une denomination quelconque.

This author suggests that glasses correcting the vision of each eye, may in the future be found to arrest strabismus, and advocates the use of the squinting eye and muscular exercises in its treatment.

Tyrrel, London 1840, Vol. II, says in reference to congenital strabismus: The vision may be at first perfect as that of the other eye; but when the patient arrives at an age to be able to express feeling, &c., correctly, the eye affected by strabismus is found to be very defective in power; and this arises from its having been very little, if at all, exercised.

Weller of Dresden, French translation, 1832, mentions the use of the monocle, as a cause of amblyopia of the disused eye.

# MEMORY HELPS IN RHYTHMIC EXERCISE OF THE OBLIQUE MUSCLES.

By N. C. STEELE, M.D.,
Professor in Chattanooga Medical College,
Chattanooga, Tenn.

Dr. G. C. Savage made two important discoveries when he discovered how to detect and to cure symmetrical insufficiencies of the oblique muscles of the eye. His "rhythmic exercise" is the only known remedy for these insufficiencies, or, as I prefer to call the condition, lack of equilibrium between the superior and inferior oblique eye muscles.

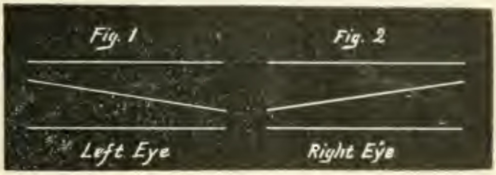
In practicing the rhythmic exercise it is sometimes a little difficult to recollect just at the moment how to place the cylinders in a given case.

Rules are in some respects objectionable, but for my own use I have two simple rules, or "memory helps", in such work.

One advantage of these "helps" is that the doctor does not have to know which set of oblique muscles is weak. All he has to do is to make a correct diagram on his memory, or a card, of the results of his first examination of each case, and have that before him at each "exercise"

For illustration, suppose I have a case in which Dr. Savage's test shows the middle line in the left eye dipping to the right, and the middle line in the right eye dipping toward the left. Of course this shows insufficiency of the superior obliques, but I do not have to know that, in order to exercise the weak muscles, if my "helps" are used.

Figs 1 and 2 show the results of Dr. Savage's tests in such a case.



I wish to apply the rhythmic exercise so as to strengthen the weak muscles, and I may not remember for the moment whether they are the superior obliques or the inferior ones. Any way the practical question is, where shall I place the axes of the cylinders?

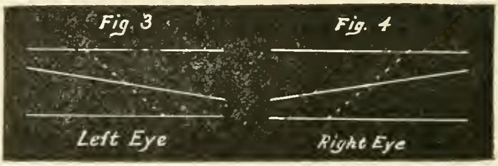
I put on the patient, the trial frame or Dr. Savage's special frame, with axis of each cylinder at 90°. Which way shall I turn the cylinders to produce the desired results?

I make the general remark here, that the lower ends of the axes of the cylinders must be made either to diverge or converge in every case of rhythmic exercise of the obliques, depending on whether we are treating the superior or the inferior muscles.

Dr. Savage correctly says that if, while the double prism is before one eye and the exercising cylinder before the other, you turn the cylinder one way, you render the middle line parallel with the other two, and if you turn it the other way 45° from the vertical, you make the line dip more than at first, thus aiding us in diagnosis. Upon this fact I hang my little "memory helps."

Now, then, with both cylinders in place at 90°, if I wish to place the cylinders in the positions to make the middle lines parallel with the other lines, I turn each cylinder in the direction which will place its axis in a general way parallel with the middle line for that eye, as shown by the test of that eye.

In Figs. 3 and 4, the dotted lines represent the axes of the cylinders.



Of course the axes of the cylinders as here represented and as placed in practice are only in a general way parallel with the dippnig lines, but for convenience I consider them parallel. Therefore, when I wish to render the dipping lines parallel with the other lines, I place the axes of the cylinders in this general way parallel with the dipping lines. Thus by associating "parallel" with "parallel" one can always remember where to place the axes to produce the paralleling effect.

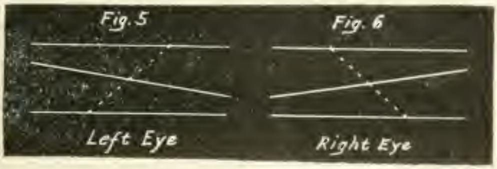
Of course it follows that if I wish to produce the opposite effect, I turn the cylinders in the opposite direction. This last position of the cylinders puts the weak obliques on tension, the amount of tension depending on the number of degrees we turn the cylinders beyond the vertical up to 45°. Forty-five degrees from the vertical puts the muscles on the maximum degree of tension.

The foregoing is one of my "memory helps" but is a little indirect.

The following one is more direct:

To strengthen the weak oblique muscles I know they must be put on tension, and to do that I must oppose them with another force. In other words I must *cross* them in their action. This suggests that I put the axes of the cylinders *across* the dipping middle lines as shown by the diagram of the tests of the eyes I am exercising.

In Figs. 5 and 6 the dotted lines represent in a general way the axes of the cylinders during rhythmic exercises of the superior obliques.



For exercising the inferior obliques, the direction of the dipping middle lines and the axes of the cylinders as represented by the dotted lines in Figs. 5 and 6, would be reversed of course: but the value of these "memory helps" holds good in all cases.

In this gymnastic exercise of the obliques, I prefer the method which may be called the graduated rhythmic exercise.

For the first period of from one to three weeks, I place the lower ends of the axes of the exercise cylinders 15° from the vertical; for the second period of the same length, at 30°, and after that at 45°.

Let the patient gaze steadily at a small flame or other suitable object 15 to 20 feet away. Have him look through the cylinders 5 to 10 seconds, then raise the cylinders 5 or 10 seconds, repeating this "rhythm" for 10 or 15 minutes at each sitting, having the sittings from one to three times daily.

# AN ADJUSTABLE BRACKET WITH TEST LENS HOLDER USED IN TESTING ANOMALIES OF REFRACTION AND THE VARIOUS FORMS OF HETEROPHORIA.

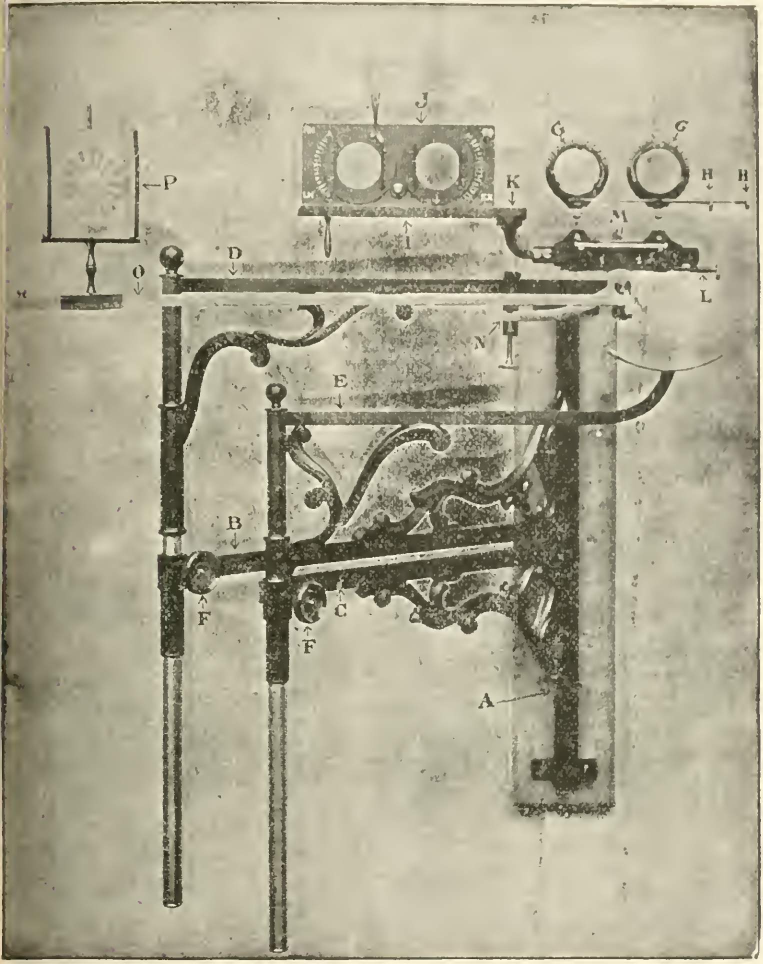
By J. FREDERICK HERBERT, M.D.

Philadelphia, Pa.

A new and improved apparatus recommended as a substitute for the heavy cumbersome test frames now ordinarily used, is intended to be screwed against the wall, window-sill or to the back of a heavy chair.

All physicians who have had experience in using the test frames usually furnished with the test lenses, know how much trouble it is at times to adjust same on the patient's face, if one ear is higher than the other, when one side of the frame will be too high and the other too low; and very often the patient will complain of the weight upon the nose, especially if the examination be protracted, and each additional lens placed in the frame only increases the patient's discomfort, which sometimes really amounts to suffering.

Then again ophthalmological instruments on stands or tripods are not made rigid enough; there is too much vibration and much valuable time is spent in placing same in the proper position in front of the patient; and they are also difficult to adjust. Having had the above difficulties to contend with, it has been the writer's aim to devise an instrument to overcome some of the objectionable features met with in the instruments used in the daily routine practice of an oculist. The illustration of the instrument with a full description is placed before the profession for their kind consideration.



A A is the vertical bar or upright from which extend the arms, B and C, fitted into sockets at both extremities, permitting the instrument to be placed in any position, from that of being folded flat when not in use, to that of the bars B and C being at right angles, and the carrier's D and E parallel, to the wall so that patient can be seated comfortably behind it when in use.

B is the upper horizontal bar with bearings at extreme end for receiving the upright which contains lens holders, etc., etc.

C is the lower horizontal bar similar to B for holding the chin rest. It will be noticed that the two bars, B and C, are separated throughout their entire length. This is one of the features of the instrument and the idea is entirely original. This is done to prevent the upper bar from being thrown out of plumb by the weight of the patient's head, after the instrument has been properly adjusted and fixed ready for use. It is quit evident that when the chin-rest is attached to the same bar as the optical portion of the instrument, the results are vitiated and we could not depend upon the accuracy of the tests. The two bars B and C are independent of each other and no matter how much weight is placed on the lower bar, the upper one is not affected in the least, which fact can easily be verified by noticing action or rather inaction of the spirit level.

D is the carrier to which are attached the lens holders, phorometer slide and small bar with test card holder.

E is the adjustable chin rest, fastened by thumb screw F.

F F are the screws holding the parts rigidly in position when adjusted to the proper height.

G G are the lens holders, graduated from 0 to 180°, similar to a test frame, each containing one revolving and three stationary cells. The outer cells revolve around the entire circle by means of an endless screw and toothed arrangement on the outer portion of the ring (as in test frame suggested by Dr. Gliver). The three pairs of inner or stationary cells (not shown in the illustration) are also of the standard size for receiving test lenses, plane or rotary prisms, the "Maddox" rod, etc., etc.

H H are the thumb screws for revolving the movable cells, and can be easily handled by either physician or patient in determining the best position or axis when correcting astigmatism, or for placing either cylinders or prisms at any desired angle.

I is the slide or receptacle for the "Stevens" phorometer.

J is the "Stevens" phorometer for testing the various forms of heterophoria.

At K there is a hinge by which the slide with the phorometer can be swung into position directly in front of the lens holders (test frame) so that tests for muscular insufficiencies can be made both with and without the correcting lenses.

The thumb screw L adjusts the lens holders (trial frame) G G for inter-pupillary distances. The bar on which the holders slide is graduated in millimeters and can be used as a pupillometer.

M is the ground spirit level for truing up the instrument which, as can be seen in the illustration, is placed directly beneath the test lens holders. This makes the adjustment quite simple and at the same time very acurate.

N is the screw and level for adjusting or leveling up the lens holders G G

The bar O is 50 centimeters long, graduated in the metric and inch systems, is brought into use when testing at the near point. It is made on a hinge joint and when in position for use it extends directly outward, midway between the lens holders. When not in use it is placed out of the way, parallel with the horizontal arm of carrier D as shown in the illustration.

The carrier P slides freely forward and back, the entire length of the bar O, and it has two sets of clips for receiving cards, test types and figures for testing the near point.

The instrument is well made in every detail, and is not only of scientific merit, but an ornament to any office, and will at once commend itself to those who appreciate and desire to do accurate work.

The instrument is made and sold by Messrs Reimold & Meister. Manufacturers of Ophthalmological Instruments, 41 North 13th St., Philadelphia, Pa.

1318 Arch St.

# A CAREFUL REPORT OF FOUR CASES, SUFFERING WITH SEVERE ASTHENOPIA, ENTIRELY RELIEVED BY RHYTHMIC EXERCISE AFTER THE FAILURE OF OTHER PLANS OF TREATMENT.

By H. McI. MORTON, M.S., M.D.,

Prof. of Clinical Ophthalmology and Otology, College of Physicians and Surgeons.

Minneapolis, Minn.

Case 1, Mr. F. B. S. age 42. Has suffered from headache, and pain in the eyes upon use, for five years. Had consulted oculists, but with no benefit to himself. Was wearing glasses for correction of compound hyperopic astigmatism, which I modified slightly, but without good effect. He was almost discouraged when I proposed that I try exercising his ocular muscles by prisms; he consented. Rhythmical exercise was carried on under my supervision three times weekly: while at home, he carried it on twice daily. He had an esophoria of 4°, right hyperphoria of one-half degree, adduction 25°; abduction, could not overcome one-half degree prism. This is the weakest externus, I have dealt with.

Result at the end of the first month: Adduction 35°.
“ “ “ “ “ “ Abduction 2°.
“ “ “ “ second month: Adduction 35°.
“ “ “ “ “ “ Abduction 7°.
“ “ “ “ third month: Adduction 38°.
“ “ “ “ “ “ Abduction 8°.

Has 2° of esophoria; one half degree of right hyperphoria: says that his eyes feel better than for years, in fact "he don't know that he has a pair of eyes"

Case II. Mrs. C. E. T., age 35. Consulted me March 25, 1893, with a note from Dr. J. Clark Stewart. Headache and a miserable "dragging feeling" upon eyes. Corrected a simple hyperopia in O. D. and a compound hyperopic astigmatism in O. S.: exophoria of 1½°, no hyperphoria. Slight insufficiency of inferior obliques, which made me anxious about the outcome of the treatment. Derived no benefit from this treatment whatever. It was difficult for her to wear her glasses. Muscular status: adduction 10°, abduction 12°. Exercise was started upon the insufficient interni.

Result at the end of the first month : Adduction 15°.
" " " " " Abduction 12°.
" " " second " Adduction 35°.
" " " " " Abduction 10°.
" " " third " Adduction 40°.
" " " " " Abduction 10°.

Has some days a slight esophoria, other days a slight exophoria. Patient is discharged cured: can use eyes any length of time.

Case III. Miss N. E. J , age 25, referred to me July 19, '93, by Dr. Bracken. Had an attack of nervous prostration in March. Is now much better, but her eyes have annoyed her so much that even the slightest use of them is impossible. Corrected an astigmatism in O. D. of 25, cyl. ax. 90°, O. S. .25, cyl. ax. 180°. Did her no good.

Muscular status: 3° of esophoria, one-half degree of right hyperphoria. Adduction, 10°, abduction 9°. Started rhythmical exercise.

Result at the end of the first month: Adduction 15°.
“ “ “ “ “ Abduction 7°.
“ “ “ second “ Adduction 33°.
“ “ “ “ “ Abduction 10°.
“ “ “ third “ Adduction 41° (easily)
“ “ “ “ “ Abduction 10°.

Esophoria of 3° still remains. In this case patient is entirely well of her eyes, in spite of persistence of her nervous condition.

Case IV. Mr. R. M. T., age 26, came to me June 24, '93, by kindness of Dr. G. G. Eitel. Had “been the rounds,” as he said—and he looked at me in a manner that clearly showed that he had very slight hope for relief. He was wearing a pair of weak astigmatic glasses, which I modified slightly as regards the axis, but no good came from it. I began to think that it was the “same old tale,” as he said. He consented to try rhythmical exercise. *Muscular status*: exophoria 2°, no hyperphoria, adduction 20, abduction 7.

Results at the end of the first month: Adduction 20°.
“ “ “ “ “ “ Abduction 7°.
“ “ “ “ second “ Adduction 40°.
“ “ “ “ “ “ Abduction 9°.
“ “ “ “ third “ Adduction 55°.
“ “ “ “ “ “ Abduction 9°.

Has rapidly improved since second month, and was so delighted that he brought me his employer as a patient. He has been discharged for some time, and on calling to pay his bill the other day, says that he “feels fine.”

*Remarks*:—I have presented but four cases out of many whose improvement has been almost, or quite as good, for these reasons:

First. These cases had not improved under other plans of treatment, even *after long periods of time.*

Second. In the cases of the two women, there was no uterine or ovarian trouble to consider as having an influence.

Third. To show the *very marked improvement* in the actual working capacity of the muscles at each test.

Fourth. To show that as the muscles increased in power, the eyes increased in utility and comfort.

Thus since other plans failed, and no other treatment was conjoined to this, it is fair to assume that exercise brought about the good results.

# A CASE OF SIMULTANEOUS SYPHILITIC INFLAMMATION OF THE MUCOUS MEMBRANE OF BOTH LACHRYMAL DUCTS.

Written for the Ophthalmic Record by
JOHN DUNN, M.D.,
RICHMOND, VA.

Mr. M. aged 38. At the age of 25 his eyes at the corners began to itch, then to run water and finally became inflamed. His oculist informed him there was "double stricture of each duct." The lower canaliculi were slit; for many weeks the ducts were regularly probed, until "a No. 14" was passed into them and allowed at each sitting to remain two or three hours. When this was removed a small silver wire would be inserted into the ducts to be worn until the time next appointed for passing these "lachrymal bougies." Although so large a probe as a No. 14 could be passed, within 12 hours after its removal the tissue about the silver wire left in the ducts would be so tight as to require considerable force to withdraw them. During the course of treatment at least one, perhaps more, false passages were made.

Several years later ulceration of the soft palate, and nasal cavities set in. Its syphilitic nature was not recognized until too late to prevent complete destruction of the left posterior pillar, one half of the left side of the palate, the vomer and part of the mes-ethmoid and the left inferior turbinate. To-day the overflow of tears continues; strictures and contractures have rendered it impossible to pass the smallest probe along the ducts, which, so far as I can make out, are obliterated.

Such is the history of a case which a few days since came for treatment. As it serves to emphasize two important points in connection with the treatment of lachrymal overflow it has been thought worthy of record. The first of these is that in a patient, "*Veneris* muneribus potens," the inflammatory process may elect to attack simultaneously the mucous membrane of the lachrymal discharge system of each eye without giving evidence of its existence elsewhere in the body. Mr. M. has no recollection of ever having been provided with a chancre. Nor had he any idea that he had syphilis until long after the destructive ulceration of the palato-nasal region had set in.

It is fair to assume now, that the whole history of the case is known, that the acute double lachrymation which began in Mr. M's twenty-fifth year was due to syphlitic inflammation of the mucous membrane of the lachrymal canals. The other special point of this case is to show the error of slitting the canaliculi and "dilating the strictures" in cases of inflammatory closure of the ducts, while the inflammation is still in existence and its cause unknown. The history of the case says on this point all that is necessary.

# OPHTHALMOLOGICAL SECTION OF PAN-AMERICAN MEDICAL CONGRESS.

## REFRACTIVE ERRORS.

### INTRODUCTORY REMARKS.

By JULIAN J. CHISOLM, M.D., L.L.D., President of the Section.

Honored Colleagues,

It gives me much pleasure to have you participate in the Columbian festivities, of which the Pan-American Medical Congress is a part. Congresses on various subjects pertaining to the Sciences and Arts have been held at Chicago in commemoration of the discovery of America. When the Doctors of this Continent assemble in Washington it is only an extension of the general features of this memorable aniversary. As Surgeons we will assist, in our own way, to further the desire to make the year 1893 one to be long remembered in the history of our nation. Within the last few months there have been several gatherings of medical men, and yet we have our special mission. With Medical Advancement for our stimulating theme we are anxious to help in the development of that great object "the preservation of health" which is so closely allied to the creative power.

Every day the human race is becoming more aware that human eye sight is a most precious gift, and they are beginning to learn how to guard it zealously. Common school physiology has taught them that the healthy functioning of an organ of the body is, not to know of its existence except through the comforts which it gives us. As soon as we are aware of its presence there is something wrong which requires correction. We who are the special custodians of human eye sight, have come together to collate individual experiences, and to put on record what we are doing in the way of maintaining the perfect working of this wonderful visual organ.

In arranging the program of work for the Section I have deviated from the ordinary course of discussing promiscuous papers only, and have assigned two topics especially for our consideration. "Refractive Errors and Muscle Irregularities how to detect and correct them."

These two eye troubles comprise the heavy daily work of the ophthalmic surgeon. From the frequent appeals for relief the correction of these interferences with comfortable vision seem to be even more important to the masses of humanity than the great operations, when we restore sight to the blind by the most delicate of surgical manipulations.

I presume that my personal experience simply reflects the daily experience of each one of us, which is, that refractive and muscle irregularities are as frequently met with as all the other eye affections put together. To have acute vision and not to be able to use the eyes with comfort is very worrying to thousands of people. To make painful eyes work smoothly, and to remove head discomforts of long standing as if by magic, through the instrumentality of carefully adjusted spectacles, is a wonderful art which is enthusiastically recognized by former sufferers. To effect this with certainty and with expedition is most desirable knowledge, and we are all seeking it. At the present time perfect relief is not always attainable. The majority of troublesome eyes adapt themselves promptly to the glasses we adjust, and can be used painlessly when the proper spectacles are worn. But sometimes we meet with rebelious eyes which our utmost care cannot quiet, and yet we feel that these should also be brought under control. We try many ways to accomplish this desired object. Experience has taught each of us a method which we individually think is more convenient or more expeditious than the course persued by others to secure the same end.

Time is valuable to both surgeon and patient. All desire *quickly* to secure *surely* the best results. Our object is to study these individual methods. In refraction cases a very important question is when to use mydriatics, and to determine which of this class of remedies is the most reliable and least annoying. In our eager pursuit after the cause of the eye disturbance we must not forget that the patient also has some rights. To blur vision for a fortnight by atropia, if the same results can be secured by homatropia, which disturbs sight only for a few hours, is an abuse of professional power against a confiding patient, to whom every hour for labor may be needful to secure bread for the daily wants. We also desire to know to what extent we can be surely aided by apparatus, other than the trial case, to detect the kind and the degree of refractive error.

For many years we have been studying with dilligence the faults in the eye-ball itself, and how to help the ciliary muscle to accomplish its important work, often to the neglect of the much larger, more numerous extra ocular muscles, with equally important functions to insure comfortable vision. We are only now waking up to the fact, too long overlooked, that the irregular action of these outer muscles fill a very conspicuous roll in causing eye discomforts. The want of equilibrium in their action must be recognized. The temporary or permanent use of prisms, to strengthen weak muscles, or the cutting of the over strong ones, are important problems for serious consideration. Complete or partial tenotomies is one of the questions of the hour.

To each of these subjects, which are now the leading ones in ophthalmic circles, we propose devoting an entire day with the hope that so much knowledge will be elicted by the discussion as to enable us to define clearly rules for professional guidance.

# A COMPARISON OF THE EYES OF WHITE AND COLORED PUPILS IN THE PUBLIC SCHOOLS OF WASHINGTON, D. C.

By E. OLIVER BELT, M.D., Washington, D. C.

Written for the Ophthalmological Section, Pan-American Medical Congress, Sept. 5–8, 1893.

By numerous examinations made in the schools of this country, and of Europe it has been found that comparatively few children are near-sighted when they first begin school, but at the end of school-life a large percentage have this defect.

According to a paper on the subject by Dr. S. D. Risley, of Philadelphia, in an examination of the eyes of 1,133 school children in the city of New York, 3.55 per cent. were found to be myopic at seven years of age, while at twenty years 26.79 per cent. were near-sighted. In St. Petersburg, Prof. Erismann found in 4,358 pupils, 13.6 per cent of myopia in the primary and 42.8 per cent. in the higher classes.

In Germany the rise was from 11.1 per cent. to 52.1 per cent. The fact of this increase of near-sightedness during school-life being established, the important point for the physician to consider is its cause and its prevention.

It is also found that hypermetropic eyes are most common in the primary grades, and there is a marked decrease in this defect by the end of school life; while the percentage of eyes with normal refraction remains about the same throughout the different grades.

Now, are the eyes which become near-sighted those which were normal or are the far-sighted eyes unhealthy ones? And do they change their refraction to normal and then continue to change until they become myopic? These are unsettled questions which should be determined if we wish to prevent these increasing defects. That heredity and older civilization have much to do with the frequency of myopia would seem to be indicated from comparisons made between pupils in Europe and in this country. And I have thought a comparison between the eyes of white and colored children would throw additional light upon this point. Whether there is a tendency for hypermetropic eyes to become myopic could only be determined by examination of the same pupils for a series of years through different grades. With these objects in view I applied to Prof. W. B. Powell, Superintendent of the Public Schools, Washington, D. C., for the privilege of making examinations, among children in the public schools.

Prof. Powell at once took a deep interest in the investigation and gave me permission to examine as many pupils as desired in both white and colored schools. This report is the summary of results found in the Grant school, which is composed of white pupils, and in the Mott school which is composed of colored pupils Mr. S. M. Ryder, principal of the Grant school and Dr. W. B. Evans of the Mott school took an active interest in the matter, and gave me valuable assistance, especially in securing consent of the parents for the examination.

Four hundred and twenty pupils were examined, 210 from each school, 15 boys and 15 girls from each grade except the first. Their ages ranged from 6 to 17 years. All defects were noted, cases of myopic astigmatism were placed under the heading of myopia, and hypermetropic astigmatism under hypermetropia. The refraction was tested with lenses and by retinosocopy. There was only one case of color-blindness in each school, less than .005% and each case was among the boys.

By most authors the usual percentage of color-blindness is from .03 to .05% among males, and less than .01 per cent. among females. I am informed by Prof. Powell that the pupils in the

Public Schools here are taught the colors, so this lessened the possibility of color ignorance being mistaken for color-blindness.

There were only four cases of amblyopia and all were among white girls. There were 10 diseased eyes in the white school and 4 in the colored; aside from errors of refraction and cases of conus, there were 5 cases of choroidal atrophy in the white and one in the colored. There were 4 cases of corneal opacity in the white, and two in the colored, and there was one cataract in each. There were six cases of strabismus in each. In the white three cases were internal and three external, in the colored one case was internal and five external.

Conus or pigment about the disc was found in 15 per cent. of the cases of emmetropia in the white, and 13 per cent. in the colored; in 21 per cent. of the cases of hypermetropia in the white, and 18 per cent. in the colored; and in 16 per cent. of the cases of myopia in the white, and 15 per cent. in the colored. In the total number of cases of conus there was an increase of only .02$\frac{2}{9}$ per cent. from the three lower to the three higher grades in the white, and of .03$\frac{8}{9}$ per cent. in the colored. Conus is thought by many to be an indication of error, or change, of refraction, and though there can be no question about its meaning in errors of high degree, it seems to me very doubtful whether slight pigmentation about the disc is always pathological.

Normal acuteness of vision was found in 80 per cent. of the white boys, and 94 per cent. of the colored boys, and in 68 per cent. of the white girls, and in 86 per cent of the colored girls.

The following was found to be the average refraction :—

| | (Emmetropic) | | (Hypermetropic) | | (Myopic) | |
|---|---|---|---|---|---|---|
| | White | Colored | White | Colored | White | Colored |
| Boys | .71% | .80 | .16 | .15 | .12 | .04 |
| Girls | .49% | .73 | .31 | .18 | .19 | .08 |
| Total, | .60% | ·76 | .23 | .16 | .16 | .06 |

The number of pupils examined was too small to get a correct idea of the decrease of hypermetropia, and the increase of myopia from a comparison of the lowest with the highest grade. But by comparing the three lower with the three higher grades we can form an estimate of the changes during school-life.

The averages were as follows :—

| | (Emmetropic) | | (Hypermetropic) | | (Myopic) | |
|---|---|---|---|---|---|---|
| | White | Colored | White | Colored | White | Colored |
| 3 high g. | .60 | .71 | .17 | .16 | .23 | .12 |
| 3 low g. | .59 | .83 | .31 | .16 | .10 | .01 |
| Increase | .01 | dec. .12, | dec. .14, | .00, | inc. 13, | inc. .11 |

This shows that the percentage of eyes with normal refraction remained about the same in the white and decreased 11 per cent. in the colored schools, while there was a decrease in hypermetropic eyes from 31 to 17 per cent. in the white, the colored remained about the same, and there was an increase of myopic eyes from 10 to 23 per cent. in the white, and from 01 to 12 per cent. in the colored. Errors of .05 D. or less were not noted except in cases of astigmatism, from the belief that it is often impossible to determine errors that slight without a mydriatic, hence the percentage of hypermetropia is not as high as found by some observers. The refraction found by me however corresponds closely with the average found by different observers in 160,000 eyes examined which was as follows :

| (Emmetropic) | (Hypermetropic) | (Myopic) |
|---|---|---|
| 58.8 per cent. | 21.9 per cent. | 19.5 per cent. |

These figures are from a paper by Dr. B. Alex Randall, of Philadelphia, to whom I am indebted for some valuable suggestions in reference to the investigation. In the following table I give the changes in refraction from the beginning to the close of school life among pupils in several cities :—

| (Emmetropic) | | (Hypermetropic) | | (Myopic) | |
|---|---|---|---|---|---|
| Beginning | Close | Beginning | Close | Beginning | Close |
| .86 | .61 | .09 | .12 | .03 | .26 |
| Decrease | .25, | increase | .03, | increase | .23 |

Examiners, Drs. Loring & Derby, N. Y , 2,265 eyes.

| | | | | | |
|---|---|---|---|---|---|
| .63 | .60 | .26 | .15 | .09 | .23 |
| Decrease | .03, | decrease | .09, | increase | .14 |

Examiners, Drs. Prout & Mathiewson, Brooklyn, 600 eyes.

| | | | | | |
|---|---|---|---|---|---|
| .07 | .12 | .88 | ·66 | .04 | .19 |
| Increase | .05, | decrease | .22, | increase | .15 |

Examiner, Dr. Risley, Philadelphia, 2,422 eyes.

White.

| | | | | | |
|---|---|---|---|---|---|
| .59 | .60 | .31 | .17 | .10 | .23 |
| Increase | .01, | decrease | .14, | increase | .13 |

Colored.

| | | | | | |
|---|---|---|---|---|---|
| .83 | .71 | .166 | .160 | .01 | .12 |
| Decrease | .12, | decrease | .006, | increase | .11 |

Examiner, Dr. Belt, Washington, 420 white, 420 colored.

The percentage of hypermetropia of 1 D. and over, was $.07\frac{8}{10}$ in the white, and $.06\frac{6}{10}$ in the colored, and of myopia was $.02\frac{6}{10}$ in the white, and $.02\frac{3}{10}$ in the colored, while the astigmatism of all degrees was 25 per cent in the white, and only 10 per cent. in the colored. These statistics seem to indicate that hypermetropia and myopia of high degrees are nearly as common in one race as the other, and may be due to malformation of the eye-ball independent of race or civilization, but that slight errors, and especially astigmatism are more commonly the result of abuse of the eyes as found in a higher civilization.

Refraction errors of 1 D. and above.

| | Hyperopia | | | | Myopia | | | | Astigmatism of all degrees | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | White | %. | Col. | %. | White | %. | Col. | %. | White | %. | Col. | % |
| M. | 11 | .052 | 13 | .061 | 1 | .004 | 3 | .014 | 47 | .223 | 11 | .052 |
| F. | 22 | .104 | 15 | .071 | 10 | .047 | 7 | .032 | 58 | .276 | 31 | .147 |
| | 33 | .078 | 28 | .066 | 11 | .026 | 10 | .023 | 105 | .250 | 42 | .100 |

| | White | Col. | White | Col. | White | Col. |
|---|---|---|---|---|---|---|
| 3 high gds. | 8 | 17 | 6 | 8 | 64 | 34 |
| 3 lower " | 21 | 4 | 2 | 2 | 30 | 4 |
| Decrease | 13, | inc. 13, | inc. 4, | inc. 6, | inc. 34, | inc. 30 |

## CONCLUSIONS.

First, that children often have defective eyes without being aware of it, and are loth to complain of their troubles, as shown from the fact that although 40 per cent. had defects which cause more or less discomfort, only 15 per cent. complained of headache, or of their eyes becoming tired or painful upon use. These children however frequently give evidence of trouble by not advancing as rapidly in their studies as others of their age, and too frequently are thought to be stupid when in fact their eyes are at fault. This is well illustrated in the second grade in which most of the pupils are 7 or 8 years of age; there were some however, still in the second grade who were 10 and 11 years of age, 80 per cent. of whom had defective eyes, which was evidently the cause of their backwardness.

Second, the increase of near-sightedness among Washington school-children is less than in most American cities, probably because their physical condition is better when they begin school. There is less poverty here. A smaller number live in over-crowded tenement houses, and their hygienic surroundings are generally better. The school buildings are well lighted and ventilated and the seats are arranged so they will not face the light. In some, however, the black-boards are placed between the windows which is not to be commended. I am informed by Prof. Powell that close application for any length of time is not required of children in the lower grades, much of their teaching at this period being by object lessons. This is a most important point, for at this age the eyes are most easily injured. I think authorities agree with Dr. Risley, who says "the probability of harm resulting from the school life diminishes with every added year of age, in all states of refraction;" however, the marked increase in myopia between the ages of 14 and 16 years would indicate that the time of puberty is a critical one for the eyes.

Third, the few cases of abnormal eyes found among the colored pupils, as compared with the white indicate the influence of the more advanced civilization in the causation of defective eyes, Especially is this so of astigmatism, which was found in 25 per cent. of the white and in only 10 per cent. of the colored pupils. Heredity also has much to do with it, myopes should not marry myopes, and parents with eye trouble should especially be careful to see that their children's eyes have proper attention, in order that they may avoid the development of the same defects.

Fourth, that hypermetropic eyes are unhealthy ones, and tend to become myopic after passing through the stage of emmetropia would seem to be indicated by the facts that the decrease in hypermetropic eyes in the white school which was 14 per cent., corresponds closely with the increase of myopia which was 13 per cent, and the greater the percentage of hypermetropia at the beginning, the more myopia at the close, e. g. in the white school there was 31 per cent. of hypermetropia at the beginning, and 23 per cent. of myopia at the close, while in the colored school there was only 16 per, cent. of hypermetropia at the beginning and only 12 per cent. of myopia at the close. These facts being established, it follows that correction of the hypermetropia at an early age would probably prevent the development of many cases of myopia during school-life.

1701 H. St. N. W.

# FURTHER STUDIES OF THE CYCLOPLEGIC VALUE OF HOMATROPINE PLUS COCAINE DISCS AS ATROPINE, DUBOISINE AND HYOSCINE SUBSTITUTES.

By CASEY A. WOOD, C.M., M.D.,
CHICAGO, ILL.
Ophthalmic Surgeon Alexian Hospital; Oculist and Aurist Cook County Hospital and to the Emergency Hospital, Chicago;
Professor of Ophthalmology, Chicago Post-Graduate Medical School.

Nearly three years ago, in an article contributed to the *American Journal of Ophthalmology*, I gave the results of some experiments I had made with mixtures of homatropine plus cocaine, and with solutions of atropia and duboisine for the purpose of comparing their relative merits as cycloplegics. The conclusions I then arrived at were these:

1. In the shape of watery solutions probably less than ten per cent. of the dissolved alkaloid becomes absorbed in such a way as to effect the eye, the remaining 90 per cent. or more being carried off into the nasal duct or flowing over the cheek with the tears.

2. Mixtures prepared with vaseline, Sanitas jelly, lanoline and similar menstrua or, as in Lang and Barrett's* experiments, castor oil, is much longer retained in the conjunctival sac. The drugs thus longer kept in contact with the ocular and palpebral surfaces undergo, as Green suggests, a much more extensive absorption and produce a still more pronounced effect.

3. They are absorbed by the blood vessels and other absorbents of the cornea and conjunctiva and not by those of the nose

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* Lang and Barrett: The action of myotics and mydriatics. Oph. Hosp. Reports Vol. XI, 130 and 219.

and throat. But such oily and greasy mixtures have this serious draw-back: they leave a thin film upon the corneal surface which interferes with the examination of the eye especially when one wishes to determine its refractive condition.

4. The form of gelatine lamellæ or discs appear to be the most useful one in which to apply agents to the eye for the purpose of securing their fullest mydriatic and cycloplegic action. These undergo a slow, regular, and complete absorption when put into the conjunctival sac.

5. The addition of cocaine to almost all the alkaloids used in ophthalmic practice undoubtedly increases their peculiar effects. (See also the reports of Maklakoff* and the experiments of Long and Barrett aforementioned.)

6 From the foregoing results and after much experimentation on the subject, I concluded that the most decided cycloplegic effects of homatropine are obtainable from its employment in the gelatine disc form, associated with cocaine.

In its most convenient and stable shape these discs cannot be made to hold more than gr. $\frac{1}{25}$ of these alkaloids: hence I was necessarily restricted to the use of gr. $\frac{1}{50}$ each of Merck's homatropine and cocaine.

Since the publication of my original paper I have not lost sight of the purpose I originally had in view, viz: the attempt to find some cycloplegic less objectionable than atropine for the measuring of refractive errors. I happen to be a firm believer in the doctrine that it is necessary to know the absolute refractive condition before one can intelligibly prescribe glasses; and I further believe that it is requisite to paralyze the accommodation as the best means of obtaining the information in the majority of patients under, and in some instances over, forty years of age.

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* Ann. Univ. Sc. Vol. IV, p. 157, 1889.

For the past year I have been engaged in this line with the gelatine discs aforesaid, with discs containing gr. $\frac{1}{25}$ of homatropine alone and with various solutions, in water, of tropa cocaine, homatropine plus cocaine, duboisine sulphate, atropine sulphate, hyoscin hydrobromate and hyoscyamin sulphate. Without troubling you with details I may say briefly, that for the determination of the refractive condition and with the idea of making the conditions of the comparative test as constant as possible, I chose those patients in whom I could employ a number of agents at proper intervals, and whose refractive state whould be most likely to afford reliable tests. These were put under the influence of the particular cycloplegic and their refractive state determined by skiascopy. Every case was carefully worked out by my assistant, Dr. T. A. Woodruff, who is an expert skiascopist.

Sometimes one agent was used first, sometimes another, but in every instance the effect of the previous cycloplegic was allowed to pass off before the second was employed. Using all possible care to avoid sources of error the refraction of thirty-four selected eyes, furnishing sixty-eight principal meridia was thus determined. The results I have here drawn up in chart form :

| | Atropia. | Hyoscin. | H. & C. Discs. |
|---|---|---|---|
| (1) | + 3 | + 3.25 | + 3. |
| (2) | + 1.75 | + 1.75 | + 1.75 |
| (3) | + 2.75 | + 2.50 | + 2.50 |
| (4) | + 1.50 | + 1.50 | + 1.50 |
| (5) | + 0 75 | + 0.50 | + 0.50 |
| (6) | + 4. | + 4.25 | + 4. |
| (7) | + 2.25 | + 2.25 | + 2. |
| (8) | + 3.25 | + 3.50 | + 3.25 |
| (9) | + 1.25 | + 1.75 | + 1.50 |
| (10) | + 2.50 | + 2.75 | + 2.75 |

| | Atropia. | Hyoscin, | H. & C. Discs· |
|---|---|---|---|
| (11) | + 1.50 | + 1.50 | + 1.50 |
| (12) | + 2.75 | + 3. | + 2.75 |
| (13) | + 2.75 | | + 2.50 |
| (14) | + 2.75 | | + 2.50 |
| (15) | + 2.75 | | + 2.50 |
| (16) | + 2.75 | | + 3. |
| (17) | + 5. | + 5.50 | + 5. |
| (18) | + 5. | + 6. | + 5.50 |
| (19) | + 6.25 | + 5.50 | + 6. |
| (20) | + 7. | + 7. | + 6.50 |
| (21) | + 1.75 | | + 1.25 |
| (22) | + 1.25 | | + 1.25 |
| (23) | + 1.50 | | + 1 25 |
| (24) | + 1.75 | | + 1.50 |
| (25) | + 3.75 | + 3.75 | + 3.65 |
| (26) | + 5.50 | + 5. | + 5.50 |
| (27) | + 2.50 | + 2.75 | + 2.50 |
| (28) | + 3.50 | + 3.25 | + 3.50 |
| (29) | + 6.50 | + 7. | + 6.25 |
| (30) | + 7. | + 7. | + 6.50 |
| (31) | + 2.25 | | + 2. |
| (32) | + 2. | | + 1.50 |
| (33) | + 1.50 | | + 1.50 |
| (34) | + 1.50 | | + 1.50 |
| (35) | + 5. | + 4.50 | + 5. |
| (36) | + 6.50 | + 6.50 | + 6.50 |
| (37) | + 5. | + 5. | + 5. |
| (38) | + 6. | + 3.30 | + 6. |
| (39) | + 5. | | + 4.50 |
| (40) | + 8. | | + 8. |
| (41) | + 4.50 | | + 4. |
| (42) | + 6. | | + 6. |

| | Atropia. | Hyoscin | H. & C. Discs. |
|---|---|---|---|
| (43) | + 8. | | + 8. |
| (44) | + 9. | | + 9. |
| (45) | + 10. | | + 9.50 |
| (46) | + 11. | | + 10.50 |
| (47) | + 1.25 | | + 1.25 |
| (48) | + 1.50 | | + 1.50 |
| (49) | + 2. | | + 1.75 |
| (50) | + 2.25 | | + 2.25 |
| (51) | + 2.25 | | + 2.25 |
| (52) | + 2.25 | | + 2.25 |
| (53) | + 7. | | + 7. |
| (54) | + 11. | | + 11. |
| (55) | + 6.50 | | + 6.50 |
| (56) | + 10. | | + 9 50 |
| (57) | + 3.25 | | + 3. |
| (58) | + 3. | | + 3. |
| (59) | + 3 25 | | + 3.25 |
| (60) | + 3. | | + 3. |
| (61) | + 1.50 | | + 1.50 |
| (62) | + 3.50 | | + 3.50 |
| (63) | + 3.75 | | + 3.75 |
| (64) | + 2. | | + 2. |
| (65) | — 1. | — 1. | — 1. |
| (66) | + 1.25 | + 1.25 | + 0.50 |
| (67) | + 4.50 | + 4. | + 4.50 |
| (68) | + 5.50 | + 5.50 | + 3.75 |

In these observations (166 in all) two drops of a 1 per cent. solution of atropia sulphate were dropped into each eye three times daily after meals for two days, and the examination made in from one to three hours after the last instillation. Of the hyoscin and hyoscyamin two drops of a 4 gr. solution were instilled into each eye three times, at intervals of twenty minutes, and the examination made in from one to two hours after the last dose.

The discs were employed as hereafter described. Every precaution was taken to prevent poisoning by the hyoscin and hyoscyamin.

Atropia, hyoscin and the discs were used for the examination of the same meridia in thirty instances. In sixteen of these the refraction was exactly the same, or the highest differed from the lowest not more than 0.25 D. In ten instances the difference was 0.50 D· In only two instances out of the thirty was there a greater difference than 0.50 D , a case to be afterwards referred to.

In these thirty cases atropia showed the highest refraction, or was one of the highest in nineteen instances: hyoscin in twenty-two instances and H and C. discs in fifteen instances. Coming now to the tests of atropia and H & C. discs we found that they were the same or did not vary more than 0.25 in 58 out of 68 meridia. In the remaining ten the result varied + 0.50 in eight cases, and in two instances there was a radical difference, to be again referred to. Speaking generally, atropia showed a higher refractive condition than the discs in twenty-one out of sixty-eight cases while the discs showed an increased refraction over atropia in four instances. In a single instance of mixed astigmatism, before referred to, did the refraction of two principal meridia amount to more than + 0 50, viz: 0.75 D. and 1.75 D. greater in the case of atropia than that shown by the discs. In this case the discs were first used. That this may happen in a second trial of any cycloplegic, in relieving a spasm of the accommodation, is well known. I have recently had a case, which well illustrates this fact, where a second trial with atropia revealed a much greater difference.

A boy, aged 16, with V. $\frac{6}{9}$ in each eye and marked astigmatism, was atropinized in the usual way with a 1 per cent. solu-

tion and the skiascopy result was : + 2.75 + 3.50
+ 2.50 + 3.25

A week later he was found to have, with full correction $\frac{9}{6}$ nearly in either eye. My suspicions being aroused by this early acceptance of his glasses I again atropinized his eyes and the result was : + 4. + 4.75
+ 4.50 + 5.25

i e. an advance of between 1.25 D. and 2. D. in the four meridia. Ten days afterwards he obtained vision $\frac{6}{6}$ — in either eye. A month afterwards his vision in each eye was $\frac{6}{6}$ with all symptoms relieved.

As a result of these and other experiments I have reached the following conclusions, some of which are modifications of the propositions contained in my first article :

1. If two gelatine discs containing gr. $\frac{1}{50}$ each of homatropine and cocaine be placed in the conjunctival sac at an interval of twenty minutes, *the eye being all the while kept closed*, the ciliary muscle will in most instances be found to be fully paralyzed in from seventy to one hundred minutes after the introduction of the first disc.

2. In persons under twenty-five years of age, or whenever ciliary spasm is suspected, the best results are obtained by the use in another twenty minutes of a third disc or one containing gr. $\frac{1}{25}$ of homatropine alone, the examination in that case being best made between ninety and one-hundred and twenty minutes after using the disc. The first two discs containing cocaine are sufficient to furnish the chief advantage which in my opinion resides in that alkaloid, viz : of increasing the absorbing powers of the cornea for agents combined with it while the increased dose of homatropine produces a more thorough relaxation of the ciliary muscles.

An eserine disc (gr. $\frac{1}{1000}$) inserted the following morning will enable the patient to do near work within an hour or two.

3. The discs should be inserted on the tip of a damp camel's hair brush and should always be applied to the ocular conjunctiva at its inferior and outer surface, the patient looking up and in, while the lower lid is drawn down. Any adherent or sticky gelatine may be easily wiped off the palpebral edges with a damp cloth or a piece of wet absorbent cotton.

In my preference for these discs over any solution of atropia I wish to state that I do so only on the grounds of the quicker and more evanescent cycloplegic action of the former.

I always use atropia whenever I possibly can, and particularly if in my judgtment, the patient would be benefited by ciliary rest, as many of our cases are. But for the business man, the clerk, the book-keeper, the doctor, the school teacher, *et hoc genus omne*, ten days of ciliary or any other kind of rest is usually impossible. It is with them either an examination for glasses of the optician-and-jewelry-store order or a transient cycloplegia.

In the list of dangerous cycloplegics I would place duboisin, hyoscin and hyoscyamin. They are all, especially the last two, much prompter and more fiercely active cycloplegics than atropia or these discs. If hyoscin and hyoscyamin are used in solution and in doses strong enough to insure ciliary paresis, i. e., in doses somewhat less than atropia and duboisin, they are certain to produce toxic symptoms more or less pronounced in about one quarter of the cases. If used at all they should be instilled in the oculist's office, and in my experiments I found this to be the only safe plan to pursue.

If this be done the refractive condition can be redily determined in one day, the ciliary paresis passing off in from seventy-two to ninety-six hours. Upon their cycloplegic action single discs of eserine have little or no permanent effect.

Tropa-cocaine has, so far as my experiments went, no cycloplegic advantages over cocaine while its mydriatic action seemed to me to be less than that of cocaine.

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# DISCUSSION OF PAPERS ON ERRORS OF REFRACTION

Dr. Risley: In opening the discussion I congratulate myself over the fact that the task before me is a pleasant one, since I am in practical agreement with the views expressed in the several valuable papers presented.

I was much interested in Dr. Belt's researches, regarding the eyes of white and colored school children. He has kindly referred to the Philadelphia school examinations. In that work the main endeavor however, was to show that the universally recognized increase of myopia during the school life was due in large measure to existing congenital astigmatism; a claim which seemed to be confirmed by the fact that in the astigmatic eyes were discovered the commencement of those pathological states of the chorioid, which in their more advanced stages were characteristic of the myopic eye, while in emmetropia or simple H. or M. not only were these changes absent, but the eyes were comparatively free from asthenopia.

In the management of refraction errors I feel it important, first of all, that emmetropia should be accepted as the refraction of the model eye, and all departures from this standard regarded as defects, and when present in asthenopic eyes, should be corrected by glasses.

As to the methods to be pursued in the management of asthenopia, it should differ widely in different cases. When the chorioid and retina are practically healthy, in many instances approximate corrections will secure the comfortable use of the eyes, and may be made without the use of a mydriatic or with the careful use of homatropin: but in cases of retino-chorioidal irritation, with wooly or "ripe-peach" eye grounds, time is an important element in their treatment; hence any endeavor at rapid corrections was liable to prove futile. In late years a very large percentage of the cases I have seen, had bad eye grounds and needed the mydriatic, not only to paralyze the accommodation, but as a therapeutic agent. In such cases the drug should be employed until the turgid state of the intra-ocular tunics subsided, after which the correcting glasses would be chosen with but little difficulty. It required time to accomplish this, and while the same end could be reached with the employment of homatropin, it should be applied more frequently and must be used longer than the stronger mydriatics. For this end I prefer hyoscyamin and although the resulting mydriasis was more enduring than that of homatropin, the total time of detention from work was no longer, and on the whole more, satisfactory and less annoying to the patient, than the prolonged and frequent instillation of homatropin. Regarding the use of the alkaloid discs, after a persistent trial I have returned to neutral solutions in water. When combined with cocaine they caused increased lachrymation. and the tears either diluted the alkaloid or washed it away. Then too, the cocaine lessens the intra-ocular tension and often disturbs the corneal epithelium. Solutions in oleaginous substances, I quite agree with Dr. Wood, are inadmisable for the reasons stated, as I had ascertained by trial, in 1875.

No mention had been made of the later chemical results in the manufacture of the mydriatic alkaloids. If the alkaloid were extracted from the atropa belladonna in the presence of an alkali or great heat, the product was atropin, but if no alkali were employed and only low temperatures, hyoscyamin was the resulting product: while on the other hand, in the presence of high temperatures and an alkali, atropin is the product even from hyoscyamus. It is important therefore that in dispensing hyoscyamin sulphate that the solution should be neutral and made at low temperatures. Recently a preparation of sulphate of atropin and sulphate of hyoscyamin, were given to Dr. Marshall, of the University of Pennsylvania, for examination with the polaroscope and neither of the drugs showed any polarizing power, hitherto the only means, except their physiological properties, of diferentiating them. It would therefore appear that the products now in the market—certainly those from Merck's Laboratory—are both hyoscyanin and then we get atropin only through the careless manipulation of the druggist. A 1 per cent. solution of duboisin or hyoscyamin is too strong to use in the manner suggested by Dr. Wood, and would, in many cases, give rise to toxic symptoms.

In reply to Dr. Savage's paper I will state that I am in full accord as to the urgent necessity for mydriatic corrections, if they are to secure any but the barest approximations to the static refraction of the eye. I could not however, agree in the statement that old men do not suffer from eye strain. The ciliary muscle is still present and susceptible of contraction, however futile its efforts may be over the now flat and inelastic lens. This was frequently demonstrated in the irritable eye and headaches of old people, who were reading or working with improperly adjusted glasses. Then too a mydriatic often affords as great relief from these asthenopic symptoms in the aged as in younger people.

The pin point pupils of people at æt. 50, reading without glasses or with too weak glasses, demonstrated still further the existence of eye strain and hence the frequent need of cycloplegics after 40 years of age. I have had no symptom of the *glaucoma ghost* which has been held up before us, from the use of mydriatics in middle life. I have used them in thousands of persons beyond the mydriatic dead line, and no harm has ever followed. It would of course be folly to use them in cases where glaucoma was imminent, or in suspicious cases.

I do not believe that spasm of accommodation is by any means confined to cases of exophoria, as I have frequently seen marked spasm, which had disappeared under prolonged use of a mydriatic and no exophoria was demonstrable.

My own experience is in full accord with the teachings of Dr. Jackson's paper. The astigmatism following those operations which open the anterior chamber I believe occurs quite uniformily.

I have recently performed extraction in two cases, in which the existance of astigmatism had been demonstrated before extraction, the axes of the correcting cyl. being required at 90°; after extraction a much higher grade of astigmatism was present with the axis of the correcting cyl. at right angles to its former position. My experience also shows a more or less rapid diminution of the astigmatism found to exist two weeks after extraction. The permanent degree probably averaged about 1.25 D. and the axis of cyl. was ordinarily required aproximately parallel to the line of cicatrix.

I was much pleased with the admirable statement by Dr. Lautenbach, of the proper value of the ophthalmometer. I use it quite constantly as an additional method, but could not trust it sufficiently to justify me in ordering cylinders by its readings, since in a careful analysis of 200 eyes, subsequently corrected under mydriasis by subjective examinations, 25 per cent. showed important discrepancies.

[*This discussion of REFRACTIVE ERRORS will be continued in the next issue of this Journal.—Editor.*]

THE

OPHTHALMIC RECORD.

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# PAN-AMERICAN MEDICAL CONGRESS.

## Discussion of Errors of Refraction Continued from last issue, page 368.

DR. BURNETT:

I was interested in the statement of Dr. Belt that he had found approximately the same number of squints in the white and colored children. My own experience in clinical and private practice has been that squint, especially of the concomitant form, was very rare in the negro.

I coincide fully with Dr. Jackson, since the results reported by him as to astigmatism following cataract extraction, are in accordance with my own, published three or four years ago. I do not think that the eye regains its final shape after an extraction, on an average, under two months.

I think Dr. Lautenbach's estimate of the ophthalmometer is just It can give us only the astigmatism of the cornea, but is, on the whole, one of the most valuable instruments we have, and if once used understandingly would never be given up. It does not give us the lenticular astigmatism directly, though it has done more than any other instrument to demonstrate its existence. A case examined this morning showed that neither the ophthalmometer nor the shadow test could be relied upon implicitly. In this case the shadow test showed those internal shadows of which I have spoken at a late meeting of the Ophthalmological Society, and whose presence indicated, in my mind, some irregularity in the refraction of the lens, and made the findings of the shadow-test unreliable. I am of the opinion, that in some particulars the old instrument of Javal is the better, particularly as to its prism.

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Dr. Snellen:

Dr. Jackson stated this morning that operations for cataract or iridectomy are always followed by astigmatism. I quite agree with him that this is due to the loosing of the tissues, and the bulging of the sclerotic. The more the wound is in the sclerotic, the more astigmatism one gets. After a paracentesis of the cornea no astigmatism occurs.

Up till now no one knows to what the good effect of iridectomy is due. My father, Prof. Snellen, started the idea that it was due to this astigmatism, or rather to the cause of it, the bulging of the sclerotic, which opens the perilenticular space.

Priestley Smith, of Birmingham, sought the cause of glaucoma in the closing of this space.

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Dr. Baker, of Cleveland, Ohio:

I was pleased with the conservative character of the papers read; and yet I suppose that every ophthalmic surgeon is at liberty to use his own judgment and experience as to the choice of a mydriatic, and the method of examination either objective or subjective.

When a patient presents himself at my office, complaining of eye trouble, immediately after making a few general inquiries, I take him into the dark room and examine him with the retinoscope. This examination should be made in a large, dark room and without a mydriatic.

Many of the difficulties complained of by Dr. Burnett in his case this morning will not be met with in the undilated pupil. The inability to discover the point of reversal in retinoscopy with the dilated pupil I think is often due to an irregular refraction at the margin of the lens. I then test the patient with the Snellen test type and trial lenses, and if I get the same result as in the retinoscopic examination, I feel perfectly justified in prescribing lenses without resorting to mydriatics, and I think these include fully one-half of my refraction cases, not including presbyopic ones.

My cases do not all come to me on account of pain and eye strain; in fact a large percentage come because of imperfect vision, and if I can improve the vision to a satisfactory degree without using mydriatics, I see no occasion to subject the patient to the inconvenience of their use. I frequently make an exception in cases of low degrees of myopia. An over-correction in these cases would prove disastrous. There is no danger of overcorrecting hypermetropia and under correction is not objectionable. And the amount of astigmatism can be accurately measured by retinoscopy. In low degrees of myopia I frequently use homatropine.

I thoroughly believe with Dr. Risley in the therapeutic value of atropia in cases of eye strain, even through no pathological changes can be discovered in the fundus. These over-worked eyes need rest. Frequently it is impossible to send these cases to the mountains or sea shore, and the best substitute I can prescribe is absolute rest for two or three weeks under atropia, and I frequently prescribe it for this purpose. Parents often will not remove their children from school and I take this method of enforcing my demands.

I find the pris-optometer of the late Dr. Culbertson, of much use to me in cases of amblyopia in young children who can not read, and in ignorant, dull people as a substitute for the test type.

Dr. Kollock, of Charleston, S. C.:

My experience with the negro showed a much greater per centage of corneal disease than has been incidentally mentioned by Dr. Belt. In my practice among the negroes, more than 37 per cent. of all diseases of the eye were corneal.

With regard to strabismus in the negro, I agree with Dr. Burnett that it is never seen in the pure-blooded negro, except in cases of corneal defects, paralysis if the orbital muscles, cataract or disease. In the mulatto it is not uncommon, though not as frequent as in the white. I think in treating of these troubles in the negro, care should be taken to state whether they were mulattoes or pure negroes. The mulatto has all the refractive troubles seen in the white, though not as common; the pure blooded negro has little refractive trouble, slight hyperopia and rarely or never myopia.

With reference to Dr. Jackson's paper, I have seen an interesting case of corneal astigmatism following a corneal section for glaucoma. This section was made with a lance knife. The anterior chamber filled with blood, and tension instead of being reduced, became of stony hardness. This continued for two days and vision was nil. Weak solutions of eserine failed to reduce the tension and the 4 gr. solution was used with the result of rapidly reducing tension, and restoring vision. This vision was $\frac{15}{200}$, and no glass, or combination of glasses would improve, but the stenopic hole gave $\frac{15}{30}$. About a month later vision was brought up to this point by a compound lens.

Dr. Tiffany, of Kansas City:

Dr. Belt in his report of the examination of school children, white and black, states that he noticed that some of the hyperopes, after a few years, increased in their hyperopia. We can readily understand how an eye can approach or even become emmetropic. My examinations of school children and students show many patientsof 10 to 12 years with H. refraction of one dioptre become at 18 or 20 absolute emmetropia or even M. but never more H. When we speak of H. we mean the static refraction, and not the dynamic. The dynamic conceals the H. to a great degree. I remember one patient, a young lady of 20, a teacher, who come to my office with $\frac{20}{20}$ but, with the dynamic set aside, her vision was $\frac{5}{200}$ requiring a + 6 D. to gain $\frac{20}{20}$. The fact is that H. does not increase but M. does.

Dr. Dean, of Scranton, Pa.:

I have not during this discussion heard any one raise the question of the mydriatic producing a low grade of hypermetropia during its action in an eye, otherwise emmetropic: therefore I rise to bring forward that subject. In my experience the mydriatic often produces .50 to .75 of a diopter. Dr. Savage did say that he did not always fully correct the hypermetropia.

I have had a few cases where I had glasses made with the correction with the mydriatics, and then been compelled to change to the correction without a mydriatic.

Dr. Allen, of Pittsburg, Pa.:

I advise simple and direct methods for the examinations of the refraction of the eyes, employing the test-case and test-card, not regarding retinoscopy and ophthamometry as of the greatest practical use. We examine the eye under the full effect of atropine. Have the patient wait until the effect of the atropine has passed off before the glasses are prescribed.

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Dr. Zeigler, of Philadelphia, Pa.:

Referring to Dr. Jackson's paper on astigmatism following cataract extraction, I wish to place on record two cases of very high astigmatism amounting to C. + 6. ax. 180° in one patient, and C. + 8. ax. 10°. These occurred during my service as House Surgeon at the Wills' Hospital, and notwithstanding Dr.

Love's remarks, under the old compress and bandage. I do not think there is more astigmatism under the use of the simple dressing of court plaster, suggested by our President, and I strongly prefer the lighter dressing.

I have recently refracted two presbyopes in whom the astigmatism was irregular. The last case showed C. + 2. D. ax. 180° ○ C. — 1.25 D. ax. 30°. I desired to order S. + 3. D. in the bifocal slip, and have had both these cylinders ground on one side of glass, leaving the other side plane for the application of the bifocal segment. This was ground on the principle of the "toric" lens, by Borsch of Philadelphia, and I herewith show such a lens.

My habit is to use complete mydriasis for all cases under 45. The stronger solutions of atropia are used before 40, and hyoscyamin sulphate after that age. I cannot rely on homatropine, and only use it when I cannot avoid it. I use a solution of 16 grs. to the ounce. In a recent case, aged 49, I was not satisfied with the homatropine, and changed to hyoscyamin. While the result in one eye was the same as in the previous test, the other one showed a change in cylinder, and a change in the axis. It is these occasional failures that shake our faith in the weaker mydriatics.

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Dr. Young, of Burlington, Iowa:

I desire to remind the Section that twelve or fifteen years ago when I, with possibly some others present, began the study of ophthalmology we had no ophthalmometer, no skiascope, no phorometer, no homatropine, no cocaine. We had only the ophthalmoscope, the trial case, and atropine; and yet we did creditable refractive work, creditable to ourselves under modern standards, and satisfactory to our patients. Now we have all the advantages and have more trouble. Is it not due to a mistaken idea of our duty, a confusion of which we ought to know, and which we ought to do (satisfactory to the patient). Dr. Risley properly sets up the emmetropic eye on the other hand; but an eye artificially made emmetropic will not necessarily be a satisfactory organ practically. We should know as much as possible about it and do our work within these lines.

As regards mydriatics I use the mydriatic, weak or strong, according to peculiarity of the case, to secure paralysis of the accommodation. Patients complain of discomfort from discs.

I find astigmatism after extraction and have used cross-cylinders in some cases.

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DR. CHISOLM:

In response to Dr. Belt's paper that the colored race in America was only exempt from refractive errors by absence of eye tax: prior to 1865 colored public schools in the South were few. Colored children up to 15 years of age were comparatively unemployed. To eat, sleep and play and look after the smaller children was their occupation. So that through the growing stage there was no eye-tax whatever. They escaped the dangerous period of school life which starts or develops refractive troubles. Now in the public colored schools colored children have all the privileges of advanced education, and the results of their new opportunity for eye work, is that colored children are acquiring the need for glasses also, showing conclusively that it is a fault of education, more than one of race. Squint in the colored race is rarely met with.

In response to Dr. Wood as to the value of mydriatic discs I would say that from neutral solutions I get all the good and prompt action that could be desired. I use homatropine grs. VI. to one ounce, put a few drops into the cul-de-sac formed by drawing the lid downward, making a small cup as it were, and requesting the patient to look downward at the same time, so as to submerge the cornea in the liquid. I secure full action of the drug in thirty to fifty minutes. From my experience the effects are already beginning to pass away at the expiration of an hour. Rarely do I find it necessory to use the stronger mydriatics, nor have I found any especial advantage in combining them with cocaine.

In answer to Dr. Savage: I do not think it necessary to paralyze completely the ciliary muscle in my refractive work, and hence protect my patients from the annoyance of atropia instilliation. I make it a rule to cover always by cylinder glasses the entire amount of astigmatism, but do not find that patients desire to have all the hyperopia covered by plus glasses. I do not succeed in keeping my patients under observation for one or two weeks. With many of them I can only retain them twenty-four hours until the action of the homatropine has passed off, and some are not seen again after the first visit. I use homatropine in about 30 per cent. of the refractive cases. When sharp answers are elicited in reference to the astigmatic charts, no mydriatic need be used. When the patient is not sure of lines nor angles, or when the angle differs in the two eyes, homatropin instillation is used to verify the examination. In the lower forms of simple astigmatism, when patients have acute normal vision without glasses, but cannot use their eyes with comfort, I have often found that an astigmatism of — 0.25 D. would be converted into one of + 0.25 D. at right angles by the mydriatic. As soon as the mydriatic effects have passed off, the myopic cylinder would be again accepted as the most restful glass, and that one should be prescribed. In quite a number of instances I have had to change the plus cylinder, given by others under the mydriatic and worn with no comfort, to the minus cylinder which was immediately restful. In the mixed cases in which normal vision without the mydriatic may be reduced to $\frac{20}{200}$ under homatropia showing 6. D. hyperopia, and an astigmatism of not more than 0.25 D., when the effect of the homatropia has passed off they would need only a small part of the spherical strength with the cylinder, probably not half of it. I prescribe accordingly, and with much more comfort to patients than if I forced them to try to accustom themselves to the whole amount of latent error.

In answer to Dr. Jackson: I agree with him fully that the extensive opening of the cornea for cataract extraction will, in the healing act, so change the corneal curvature as to cause more or less astigmatism. Most of this irregularity passes away in the course of time, so that glasses given at the end of a fortnight, the time that most of my cataract patients are dismissed, need changing in a few weeks or months. Dr. Love thinks that his patients escape these irregularities of the healing of the corneal wound by the peculiar manner of his eye dressing, regulating the eye pressure, and tightening the bandage the third or fourth day after the operation. I have for many years considered the typical dressing of an eye after cataract extraction simply the closed lids, the cartilage of the upper lid acting as a splint for perfect adaptation of the corneal wound, held in position by the tonicity of the palpebral muscles. Formerly a piece of light adhesive plaster secured this result, and I still consider this the very best of eye dressing: but now I have laid this aside, as I found it interfering with the daily examinations of the eye which I think the simple cataract extraction of the present day requires, to recognize hernias of the iris, should they occur. My present dressing is a single Liebreich's bandage to cover only the eye operated upon, and to hold in position a thin pad of absorbent cotton, *which makes no pressure.* At the time that Dr. Love is tightening his bandage I remove mine altogether, leaving the eye free and open. I never bandage over five days, and have released the eye after three days of closure. I find the astigmatism neither more nor less than those who use much more manipulation and restraint than I do. This traumatic astigmatism belongs to the healing of the wound and not to the kind of dressing used. I never cover but the one eye operated upon, leaving the patient the use of the other.

With Dr. Lautenbach I agree fully as to the restricted value of the ophthalmometer. I find it useful and again very disappointing. The only concise work that I secure is by the trial lenses and astigmatic cards. We all acknowledge that they alone are reliable. I proceed to their use at once and only use the other means and apparatus to aid, should difficulties arise from the irregular responses of patients. With intelligent patients I rarely find trouble; with the ignorant and timid, we must use all the means at our command for securing the best diagnosis. There is no doubt that constant practice with any method of investigation will enable one to derive much more information from it than those who only use the method incidentally, and yet I feel assured that the few enthusiasts who profess to get everything out of the ophthalmometer of Javal, much more even than Javal himself contends for, are misleading the younger members of our profession.

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Dr. Hubbell, of Buffalo, N. Y.:

I think the most of us will agree that astigmatism almost always follows cataract extraction. How to make it as little as possible is the question. My experience is that the greater the pressure from the dressing, the greater the astigmatism that results after operation. I aim simply to keep the eye lids closed without any pressure. I use a light packing of absorbent cotton over both eyes and a bandage consisting of a piece of flannel six inches long and two inches wide with a piece of tape three-fourths of an inch wide sewed to each end. One of the tapes is carried around the head over one ear, under the occiput, and over the other ear to the other side, where the two are tied as loosely as can be done to keep the bandage and dressing in place. This is comfortable, very easily re-adjusted, and produces no pressure. I thus cover both eyes for the first four or five days, but do dot restrict the freedom of the patient.

In the correction of refractive errors I combine the use of Javal's ophthalmometer (pattern of 1889), skiascopy, and the trial lenses. The trial lenses are the final resort in all patients who can read. The ophthalmometer has its draw-backs. A slight variation from the position of sharpest focalization, which is not always easy to determine exactly, correspondingly changes the readings from the target-images. An error of 0.25 D. to 0.50 D. can thus be very easily made. Again, with the most acurate focal adjustment possible, the readings in the great majority of cases show greater refraction in vertical, or nearly vertical, meridians of the eye than by any other test, objective or subjective. This difference, also, is not a fixed quantity, but varies in different patients. In a very few cases after most careful use of the instrument, I have been surprised to find the other tests placing the astigmatic meridian directly at right angles to that which it had indicated. The cases, however, are so few, comparatively, in which discrepancies are great and positively misleading, that I consider the ophthalmometer a most suggestive instrument, generally giving, approximately, the degree of astigmatism and a tolerably correct direction of the meridians of greatest and least refraction.

The shadow-test is to me an invaluable objective method of examination. But this, too, has its weak points, although not as misleading as those of the ophthalmometer. In some patients the pupillary shadows do not move normally, so to speak. They either move simultaneously from opposite sides of the pupil or irregularly. In one case which I recall, the shadows moved normally in one eye, but in the other eye no shadow could be produced in any direction with or without plus or minus glasses, although the fundus could be distinctly seen with the ophthalmoscope and appeared normal with refraction nearly emmetropic. The vision in this eye was very amblyopic. I have no explanation for this anomalous response to the shadow test, although I studied the case carefully and with the eyes under the influence of homatropine. Again, the movements of the shadows when normal, will sometimes indicate a spherical glass weaker and sometimes stronger than the patient will accept by the subjective test. With normal shadows, however, the degree and approximate direction of astigmatism can be quite accurately determined.

The cases in which, with normal movements of the shadows, this method of examination gives results at variance with that by the subjective method are so few that I rely upon it with great confidence, and it is most helpful, even indispensable to me in amblyopic eyes, and in children and others who cannot read.

The first thing I do in a case of suspected refractive error is to ascertain the acuteness of vision. If, without or with concave or convex glasses, I find vision equal five-fifths or better, I do not use the ophthalmometer, as there is not likely to be sufficient astigmatism for the readings of the instrument to aid me. But if the vision is below normal, especially if much below in spite of spherical glasses, I at once place my patient before the instrument with the expectation of getting some hint as to whether astigmatism or some other condition is the cause of the reduced vision. If it shows astigmatism, this may be the cause, although there may be associated amblyopia; if it shows no astigmatism, I look for some other cause. If astigmatism is present, its axis is indicated and I can estimate its degree, approximately. In short, in one moment it tells me in what direction to work. Its use takes so little time that I am always glad to avail myself of such suggestions as it may give, and I therefore use it constantly in the cases indicated.

In testing for refraction I almost constantly use homatropine, eight grains to the ounce of water. I instill a drop or two at intervals of three or four minutes for three or four times. I expect to get the full cycloplegic effect in thirty to forty-five minutes, when I proceed with my examination. I do not believe longer time is necessary. I get such satisfactory results with homatropine in refractive work that it is very seldom, indeed, that I resort to atropia. I use the latter only in suspected cases of accommodative spasm, or in rare cases of apparent inability of homatropine to sufficiently suspend the accommodation. I consider it unnecessary, and therefore unjust, to inflict upon a patient the prolonged inconveniences and distresses of atropinization, when the transient effects of homatropine serve the desired purpose. I do not get satisfactory results in refraction work without using some cycloplegic; and homatropine, being transient in its effects and yet sufficiently powerful, serves my purpose well.

In ascertaining the amount and direction of astigmatism, I use three parallel, revolving lines as small as the patient can see distinctly. The patient being seated fifteen or eighteen feet from the test-object, and the eyes being under the influence of the cycloplegic, the lines are turned to the position in which they are most distinctly seen through the spherical glass of strongest refractive power accepted for test-letters. Then by trying stronger and weaker lenses, I find the one which makes the lines most distinct in this position. This corrects the meridian of the eye of least refraction. The meridian of greatest refraction usually being at right angles to that of the least, the lines are then turned at right angles to the first position, and the spherical glass found, if any is required, which brings them out most distinctly here. The one or two spherical glasses thus selected now indicate the difference of refraction between the meridians of least and greatest refraction, and this difference determines the cylinder that should be used alone or in combination with a spherical to give the best vision. The axis of this cylinder should correspond in direction to the lines placed in position at right angles to that in which they are distinctly seen with no glasses or with the spherical with which the combination is to be made. The patient is then asked to look at the letters through this combination and slight variations in the direction of the axis of the cylinder and in the power of the glasses for the two extreme meridians are tried. If an improvement in vision is shown, a corresponding change is made. It is seldom, however, that I find any material change necessary.

I rarely have occasion to prescribe crossed cylinders. For regular astigmatism the sphero-cylinder is optically the same as corresponding cylinders placed at right angles to each other, and the former are much more easily made.

In astigmatism, as in other forms of ametropia, where patients make doubtful or contradictory statements, I rely chiefly upon the evidence afforded by the shadow test, together with such corroboration as the ophthalmometer may yield.

In prescribing glasses for ametropia I correct all of the astigmatism, even small degrees in sensitive patients; all of the myopia, unless there is some special contraindication: and all of the manifest, and one-half to three-fourths of the latent, hypermetropia. There are some cases of hypermetropia, however, who for various reasons require full correction, and others who are more comfortable, at least for a time, with a correction barely exceeding that which is manifest. In all my refraction work I do not forget the relation existing between accommodation and convergence and the change which glasses are likely to produce in it.

Dr. Corr:

Mr. president and members, there are three or four points in the discussion on errors of refraction and their mode of detection and correction that, it seems, have not been quite fully enough dwelt upon.

The first of these I will put in the form of a question. Has any one, in books or otherwise, given a *standard* of *relaxation* of the *ciliary muscles* or *gague* by which we may know that we have allowed the desired cycleoplagic condition of the ciliary muscle as a prerequisite to determining refractive errors?

Dr. Wood, and all others as far as I know, who have spoken here have referred only to the dosage, and time after administering it as the only thing to be taken into consideration, without regard to the patient's ability to, in a greater or less degree, manage or command the use of the muscle. A moment's thought will lead you to say that this cannot so frequently be so implicitly relied on. Hence some systematic plan ought to be agreed upon, by which the proper condition of the muscle may be determined. Until this is done, the controversy between the relative value of homatropine and atropia will be continued.

I suppose each one has established some standard or gague for him or herself, but the trouble is they do not agree, hence our results and conclusions do not agree when they should, for we are striving for the same thing amid conditions that are very similar.

I will not impose on you details of varing procedure, but give my gague or standard. After running over the case in a superficial way so as to determine the vision and the accommodative power—determining finest print the patient can read, I begin my dosage—usually homatropine 1 per cent. sol., of which I instill a drop every five or ten minutes for three times, or oftener, after which I wait a variable time, half to one hour. Then I present them a card with grades of print, from diamond to very large print. When the patient could read medium or fine print before he will usually say, I can't read any on the card. Then I take a + 2.50 or 3. D. lens and place before his eyes, when, if that or a stronger lens only enables him to read as he read be-before mydriasis, I conclude that the muscle is fully relaxed, from this as a *standard* or gauge I proceed to determine the error of refraction.

The *next* point is the one of so-called *mixed astigmatism.* I agree with all who may assert it, that there are many cases of apparent mixed astigmatism, but I have never met with a case that did not under proper mydriasis restore itself into some simple variety, or compound variety of astigmatism.

The *third* point is the one referred to by Dr. Chisolm, that of prescribing — cylinders ax. h. in cases of hypermetropic astigmatism. I suspect these are the cases of mixed astigmatism referred to, and involves the question as to whether you would prescribe a — cylinder ax. h. in a case where there is simple hyperopic astigmatism in h. mer. requiring theoritically, and I believe practically, a + cyl. axis vertical.

Another *point* that I think should be emphasized more definitely is that, according to circumstances, of *requiring the patient to wear* a full correction. I think this ought to be insisted on, in many cases. as importunately as is agreeable. As is well known, the distant vision is not so good for a variable length of time with the full correction, but of this the patient ought to be advised, that the medicine must be taken for a while, bad as it is and soon it will taste better. *Here another point suggests itself* that of whether we should lead our patients to expect a cure of their eye discomfort or headache, or whatever led them to seek advice, except amblyopia, so they will not always need to wear the correction. I have seen cases of perpetual and torturing headache for many years so far cured that they could leave off the correction, still pursuing their studies or business with immunity for years.

DR. JACKSON, of Philadelphia:

Some accommodation may in a few cases remain when the refraction is quite fixed. This can only be discovered by prolonging the mydriasis. When there remains voluntary accommodation, the most valuable means of detecting it is skiascopy. The test with lenses either at a distance or near is liable to the fallacy that one part of the pupil may have one degree of ametropia and another part may have a different degree, allowing distinct vision with different lenses although no accommodation is present.

As a mydriatic I use habitually duboisin and homatropin, the former I prescribe for use in the patient's home, the latter I always instil myself, placing a drop of the 2½ per cent. solution at the upper margin of the cornea. Under these circumstances, I see failure to produce complete paralysis more frequently with the stronger mydriatic. It is extremely important that the instillation should be made effectively.

With reference to post-operative astigmatism, Dr. Snellen raised the point of the influence of the position of the incision. In the cases on which my paper was based, no such influence could be determined. About one-half were cases of simple extraction with the incision in the clear cornea. One-third were cases of extraction with iridectomy with the incision in the sclero-corneal junction. The remainder were cases of iridectomy for glaucoma, the incision in the extreme periphery of the anterior chamber.

They were carefully studied as to the influence of the incision on the amount of the astigmatism and gave only negative evidence.

The increase of hyperopia during cicatrical contraction, referred to by Dr. Hansell was noted in a number of cases, in one the H. rose from 7. to 11. D., the astigmatism remaining 3. D. throughout. The ophthalmometer indicates that this change is mainly due to a shortening of the anterio-posterior diameter by retraction of the cornea.

High tension after iridectomy as referred to by Dr. Kollock, must be due to jamming of a large lens into the ciliary ring and cannot affect the anterior chamber while the incision remains open.

Dr. Hansell:

My experience in refraction of aphakial eyes agrees in the great majority of cases with the observation made by Dr. Jackson. That astigmatism diminishes during the few months following the cataract extraction. I have had, however, a case which has proven an exception. Four weeks after operation, I prescribe + 12. ⬭ + 4. cyl. ax. 180°. Four months later I re-examined and discovered that the astigmatism had remained unchanged but that the H. had increased to 16 D.

Dr. P. D. Keyser:

I regret that I was obliged to leave this morning before hearing all of the papers read, my duties requiring my attendance in the Section on Hygiene for the time. As to the remarks of Dr. Kolloch, in relation to the negro never having myopia, I must say that there must be a diference in the eyes of the black race in the South from those of the North. Our confreres of the South have much greater advantage in seeing more eyes of the negro, than we in the north, but in my experience of more than twenty years in the Wills' Eye Hospital of Philadelphia, I have found several what we call pure negroes, suffering with well marked myopia as well as compound myopic astigmatism. One case near my office of a very dark coachman of a well known physician of our city, wears — 6 spherical and only last week I fitted a compound myopic astigmatism. Realy in my experience I find as the negro is being educated to read that their attention is being called to the defect in vision and they seek assistance, and in proportion as these educated persons come to my office, I find almost an equal defect as in the white.

In relation to Dr. Jackson's paper, astigmatism following cataract extraction, I desire to state that Græfe, in 1863 to 4, called attention to this defect after his modified linear incision, and I have noticed it in all extractions by any form or place of incision as well as in iridectomy. I look at it as being caused by the swelling and thickening of the cicatricial line of the corneal incision in the process of healing—always soon after the healing of the wound irregular curvature of the cornea is much greater than is found after several months. It is very frequent that it is necessary to change the cylinder six, twelve and twenty-four months after the change in the cornea, caused by the skrinkage of the cicatrix. It is very rare that astigmatism is not found in operations on the cornea, which requires correction for good vision.

I agree with Dr. Savage in the necessity of complete paralysis of accommodation in many cases of examination and adjustment of glasses; especially is it necessary in small children who have strong muscular power and unable to aid the examiner. Homatropine and such remedies do very well in adults and are mostly sufficient, but not so in children. With them, atropia to complete suspension of accommodation gives the best result in many cases. But judgment is necessary in making a full correction. I find many cases in which it is impossible to put on the glasses found correcting the defect. A certain amount of play of accommodation must be allowed to relieve the patient from discomfort.

DR. LOVE, of Mexico:

I do not think it is prudent to leave a patient after cataract operations with only one eye covered. On this subject many oculists are becoming too enthusiastic, some only closing the eye with a sticking plaster of some kind, leaving the other eye open. My practice is to use a modification of Liebreich's bandage, i. e., a slight compress, partly made of light knitted cloth, and covering both eyes, for about from seven to ten days, except when cleansing almost daily with an antiseptic solution. By this treatment I do not find as much astigmatism as most oculists complain of.

DR. HIRAM WOODS, of Baltimore:

Practice test for ciliary paralysis after the use of a mydriatic, which I have used for some time, is to get the best distant vision and then add a weak concave glass. Myopic refraction must be previously excluded. If the best distant vision is retained with a concave glass as strong as .5 to .75 diop., I do not trust the cycloplegia. I have seen total dilatation of the pupil from homatropin, and an accommodative range left of 1 D.

DR. LAGLAYZE:

Some oculists employ indifferently mydriatics for the correction of any vice of refraction. The diameter of the pupil exercises considerable action on the visual sharpness, because the dimensions of the circles of defusion are in direct relation with the degree of dilatation.

The diameter of the pupil would not influence much the clearness of the image, notwithstanding the spherical and refractive aberration that all eyes possess, if the cornea was spherical. The cornea has an elipsoidal form, and, according to the latest measurements practiced by Sulzer, it results that if it passes from the center to the surface, the curvature diminishes irregularly, not only in length of two principal meridians, but also in the two halves of the same meridian. This arrangement causes the difference between the central refraction and that of the peripheral parts. We conceive, then, that atropine, allowing that the peripheral parts of the cornea participate in the vision, produce the variation, and therefore that the correcting glass selected in these conditions is not the most convenient.

In hypermetropes in general glasses must not be prescribed when under atropine influence. The hypermetropic, by the habit of constantly accommodating, has established a harmony difficult to change between convergence and accommodation, employing a part or the whole of its relative ampleness for positive binocular accommodation.

Yet the use of mydriatics must not be put aside absolutely. There are cases, for example, when an indication has been filled, when we suspect an irregular contraction of accommodation, and also in ciliary spasms of the whole muscle.

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Dr. Belt, of Washington, D. C.:

In reference to Dr. Jackson's paper on astigmatism, following cataract extraction, I am inclined to think that a large amount of astigmatism is due to our prescribing glasses, and allowing the use of the eyes for reading too soon after the extraction.

The patient, having been blind for sometime, is impatient to see to read and work, and wants his glasses as soon as possible, and when he gets them he thinks he should be able to read with as great facility as ever, and when he finds he cannot do that, by great effort tries to bring to his aid the external muscles and lids, and this great pressure on an eye ball still weak and pliable as when the corneal section was made, causes the astigmatism.

This is probably counteracted later on by contraction of the wound by cicatrization, thus decreasing the astigmatism. However astigmatism may develop a year or two after extraction, e. g., in a case operated upon by me about two years ago, three months after extraction, vision was $\frac{20}{30}$ with + .10 D. three months later a + 1. D. cyl. ax. 180° was required to give that vision, and a year later + 2. D. cyl. ax. 180° was required.

In reference to the use of discs of homatropine and cocaine as recommended by Dr. Wood. I tried discs of homatropine, thinking they would be convenient for the patient to use an hour before coming to my office, so I could proceed at once with the examination; but usually I found as a result conjunctival irritation sufficient to interfere with the examination, so I have gone back to the use of solutions. I think the combination with cocaine objectionable owing to its causing dryness of the corneal epithelium which prevents clear perception.

Dr. Kolloch called attention to the few cases of corneal disease found by me among the colored pupils, knowing its prevalence generally in that race. I can only account for it by the carelesness of negro parents, in allowing children with even slight trouble to remain at home. I did not pay especial attention to the question of whether the cases of strabismus found in the colored pupils were among mulattoes or the pure-blooded negroes.

Dr. Wood, of Chicago:

There are several points elicited by the discussion of my paper which I desire to further elucidate. If it be true, and I do not think that the statements have been successfully controverted, (a) that solutions of the cycloplegic alkaloids in water are less effective than the same agents in oily suspension or solid form, it must follow that homatropine disks are more effective than that drug in solution; (b) likewise if the effect of the ordinary alkaloid on the eye is increased by the addition of cocaine to them, homatropine *plus* cocaine is a more effective cycloplegic agent than the former alone; (c) the disc form, with cocaine, is the best one in which to exhibit homatropine when we desire to obtain its fullest effects for the determination of refractive errors. To prevent the deleterious action of the cocaine on the cornea, it is absolutely essential that the eyes be kept closed during the whole time that elapses between the use of the first disc and the beginning of the axamination proper. The omission of this important detail is responsible for many of the failures to obtain satisfactory results with these agents.

Not only is the epithelial disturbance thus reduced to a minimum, but the scleral congestion and the foreign-body-feeling and smarting shortly disappear when the eye is thus kept in a state of rest.

Regarding the different effect upon the system experienced in the case of hyoscyamin by Dr. Risley and myself, I can only attribute them to differences in the samples supplied by our different druggists. This alkaloid in my hands has proved so uncertain, and so troxic, that I have entirely dismissed it from my armamentarium as a cycloplegic.

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Dr. Savage, of Nashville:

My advocacy of complete suspension of accommodation is as much in the interest of the operator as of the patient. A full knowledge of the error should be had; not that, in all cases, a full correction should be given, but that a correct record should be made. The "balance" of the lateral muscles should determine if no correction, a partial or a complete correction of the focal error is to be made. And let me insist that these muscles be tested when the eyes are uninfluenced by the mydriatic. As to the correction of astigmatism: this can be done in any case by either + or — cylinders, the one increasing the refraction of the least refractive meridian, the other decreasing the refraction of the greatest refractive meridian, and in either case the astigmatism is corrected. Knowing the existence of a lateral muscle error but ignoring its treatment, we should be guided by this knowledge in prescribing + or — cylinders. If there is hypermetropic astigmatism associated with exophoria, a — cylinder correcting the astigmatism would add to the patient's comfort, while a + cylinder would increase his discomfort. If the hypermetropic astigmatism should be associated with esophoria, it would be folly to correct the astigmatism with a — cylinder, for it would make the patient worse. The correct thing to do would be to treat the muscle error and cure it, either by operation or by exercise, and then prescribe the lenses indicated by the state of the refraction.

I am asked if a mydriatic is not necessary in our study of cases of mixed astigmatism. It is, but not more so than in the other forms of astigmatism. We may have a case appearing to be mixed astigmatism which the mydriatic will show to be hypermetropic simple or compound. On the other hand we may have a case of apparently myopic astigmatism simple or compound, which the mydriatic would show to be mixed astigmatism. Mixed astigmatism is so rare that a man's reputation may suffer who fails to find it when it exists; or supposes that he has found it when it does not exist. The mydriatic can alone make him certain. If he should find it he should tell the patient of it; and if he does not give the mixed correction he should give his reasons to the patient. Otherwise when the patient drifts into the hands of some confrere he may remark: "I have always considered Dr. ——— a competent man, but he missed it badly in your case." It is always best to know the refractive error and to correct it, or give the patient some good reason for not prescribing a full correction.

To the question just asked by Dr. Corr: "Do glasses scientifically prescribed relieve the symptoms, headache, etc., commonly attributed to eye-strain", I will answer by reporting a case that has come under my observation. The patient not only suffered with headache but was also an epileptic. I was asked by the physician in charge of the case to examine the eyes and correct any error found, with the hope of a cure. It was agreed that the patient should not be told that we suspected that anything like a causative relation existed between the eyes and the epileptic attacks. I found 4.50 D. hypermetropia in one eye and 5.00 D. in the other, with slight astigmatism in each. This was seven years ago when I was not a believer in muscle troubles, hence did not then know that this patient had an esophoria. I fortunately prescribed a full correction. The glasses were worn more or less continuously four years, with relief from headaches and epileptic seizures. Not having been impressed that the glasses had brought this relief, the patient began to leave them off, and finally entirely ceased wearing them. The epilepsy returned and, strange to say, the glasses were still neglected. Four months ago the new family physician, in getting a history of the case, learned of the wearing of the glasses and the coincident immunity from suffering. He sent the case to me for investigation again. I did not re-examine the focal condition. Having in the mean time learned something of heterophoria (thanks to Dr. Stevens who made this study a possibility, and thanks to my good fortune that I stumbled into this study even as early as I did), on investigation I found 4° of esophoria, about the same for near and in the distance. On placing the full focal correction before the eyes, I found both the focal and the muscular errors were corrected by them. This I expected, from my knowledge of the relationship between the centers of accommodation and convergence.

For the first time I told the patient that the epilepsy was due to errors of the visual apparatus which the glasses corrected; and I gave assurance, based on four years of relief by wearing the glasses, that these would cure because they would remove the cause. There have been no other attacks, nor do I expect any so long as the glasses are worn.

[Dr. Jackson's paper, to which frequent reference has been made in these discussions, will appear in the next issue.—Editor.]

# SKIN GRAFTING AS A THERAPEUTIC AGENT IN MALIGNANT GROWTHS,

By FLAVEL B. TIFFANY, M.D.,

Kansas City, Mo.

Eleven years ago I called attention to the efficacy of skin grafts in malignancy. The report was published in the St. Louis Medical Journal, December number, 1882, with illustrations. It was as an effort to smother out malignant growths that continued in their persistency to spring up from the empty orbit after exenteration of the eye-ball, which was enmassed by an epithelioma.

The patient was a negro, aged 58 years; the tumor originated at the margin of the inferior lid of the right eye, but when patient visited me, February 7th, 1882, it had extended to the eye-ball, to the superior lid, and to the cellular tissue of the orbit.

The tumor had then grown to the size of a large osage orange. The eye-ball was entirely enmassed by the growth and invaded by its malignancy which extended to the cheek.

To remove the growth I was obliged not only to sweep away both lids and part of the cheek, but also to completely exenterate the eye-ball with the entire orbital contents. The orbit was then packed with gauze saturated with sulphate of iron to control the profuse hemorrhage. This packing was left for several days and after its removal the orbit was dressed by a carbolized wash; but in a short time several cauliflower growths sprang rapidly up from the sides and near the apex of the orbit and grew with rapidity. These were removed by the scissors and the surface seared or cremated with a *Paquelin* thermo-cautery, but still the growths persisted and as fast as they were cut away or destroyed they would return. Several times were they burn-ed down by the cautery or by the zinc paste, but as often did they reappear, especially the ones near the apex, until finally I resorted to skin grafts taken from the chest of the patient. These grafts were large, measuring some more than one-half an inch in width and three quarters of an inch in length. They were of the true skin and were immediately transferred without handling, and conveyed directly to the raw and granular surface of the diseased orbit. Here they grew with avidity, and in no instance was there any death or sloughing of the grafts. At this time there had never been any account of such large grafts used and in no instance had they been previously employed for the purpose of subduing malignancy. The grafts smothered the flames at once and wherever they were placed there was no recurrence of the disease.

This accidental use of skin-graft in malignant tumors with the results, showed that the potentiality for good in a few healthy, living cells was even greater than that of an army of malignant ones for evil. It was like introducing a few good, law-abiding citizens into a gang of thieves and outlaws, where the few rule and peace and order is gained.

This patient is still living, or was a year ago, and there was no sign of a return of the cancer—a period of ten years.

This was my first case of skin grafting as a therapeutic agent in cancer, but it is not my only case. I have resorted to skin grafting many times since in malignancy of the orbits and eye-lids. I use large grafts from some remote part of the body of the patient himself.

In making these plastic operations the most scrupulous sanitation is adhered to. I first see that the patient is in as good general health as possible and then with scrupulous cleanliness I transfer the grafts. I have several times used grafts more than an inch long and nearly an inch in width. Very recently for ectropion of the lower lid I used a graft three inches long and one and a half inches wide, without the least sloughing of the graft which was taken from the forearm of the patient

I first scrub the surface of the malignant parts (mayhap the eye-lid) with soap and water. Afterwards with a solution of bi-chloride of mercury, 1 to 1000 The parts from which the graft is to be taken is also subjected to a thorough cleansing with flesh brush, soap and water and then bathed with the antiseptic solution. The malignant growth is removed, its bed or seat is measured and a corresponding measurement is outlined upon the arm or chest from where the graft is to be taken, and then the graft is cut about one-third larger than the dimensions of the cavity to be filled. It is transferred without handling immediately to its new abode where it is fixed in position by a few stitches of delicate silk, which has been passed through the bi-chloride solution.

I have some photographs of a man upon whom I made an operation last year for cancer of the upper lid of the left eye. The history of this case is as follows: Noticed a small growth on the lid of the left eye fifteen or twenty years ago. It began to grow rapidly in 1880, at which time the crust was removed. It grew slowly until 1888, at which time he was advised to have it removed. At the time that he visited me, November 23, 1892, the growth measured 6 *mm* in width and 20 *mm* in length. It had a thick crust with indurated edges and pus beneath.

In order to remove it nearly all the integument of the upper lid had to be taken, which, of course, necessitated a plastic operation to avoid ectropion: but in inserting the plant the principal object in view was to indemnify against any recurrence of the cancer. In removing the growth, care was taken to include all the suspicious adjacent tissue. The excision included the integument and subcutaneous tissue down to the tarsal cartilage. One photo shows the appearance of the growth immediately before extraction and one photo, the condition several days after the operation; the last photo after complete healing, some two weeks subsequent to the planting.

In making these plastic operations, I endeavored to secure as good health as possible before operating, as the life of the plant depends much upon the general health of the patient. From one-fifth to one-third larger plant than the dimensions of the space it is to occupy is secured. Only the true skin free from fat and subcutaneous tissue is taken Also the bed as well as the plant is freed from hemorrhage as blood in the cavity gives rise to suppuration and sloughing. The graft is secured by delicate silk or cat-gut and the parts are then carefully covered by antiseptic gauze. I do not use the isinglass plaster and collodion, nor do I ever use iodoform. I dress the parts daily but do not disturb the plants for seven or eight days, usually leaving the sutures for this length of time. At first the graft is of a white, deathly, cadaverous appearance, but soon it takes on a red look and after a few days becomes normal in color. Occasionally the epidermis becomes black and may exfoliate, but there is no sloughing and soon perfect skin will assert itself. Cases in which I have resorted to plastic surgery with a view of indemnifying the parts against a return of malignancy are those of the orbits and of the eye-lids and of epitheliomata only.

I have used it quite a number of times and as yet where I have employed it there has been no return of the cancer. It has been my experience that these grafts are more sure to live without a pedicle than with. Care should be taken to select them from the part of the body where the skin is thin and as free from hairs as possible.

# TWO CASES OF SYMPATHETIC OPHTHALMIA.

By J. H. THOMPSON, M.D.,

Kansas City, Mo.

The following two cases of sympathetic inflammation of the eye are reported because they may be useful, for reference, to any one who may desire to write upon or discuss this subject.

Case I. John K., 35 years old, farmer, a lean, tall, muscular man, was wounded in the left eye by a piece of iron, struck from the head of a nail. The iron did not penetrate, but the trauma involved the ciliary region, opening the anterior and posterior chambers The iris was prolapsed into the lacerated wound. This accident happened some 18 months before I saw the patient and although in the mean time, the wound had healed, still the eye had not been free of inflammation. During that time there had been frequent attacks of pain in the eye and supraorbital neuralgia. It was during one of these attacks I removed the organ.

The wounded eye was completely disorganized, and it was evident that the irido-cyclitis which followed the injury had not disappeared, for on the day of operation the eye was red, tender and soft. There were no evidences of sympathetic trouble at the time, the other eye was healthy and the vision normal. The man recovered rapidly from the enucleation. He did not wear an artificial eye, because he could not find one that suited him.

Fourteen months after he returned, suffering from well marked sympathetic iritis. He said that five weeks before he noticed that his eye was red and somewhat painful, which disappeared in a few days. He had another attack, and then another and finally fearing that he was going blind, he came to the city.

On examination, I found chronic plastic iritis, pupil about 3 *mm* in diameter, a few synechias; anterior capsule dotted with black pigment and the vitreous too clouded to permit a view of the fundus. His vision was correspondingly bad, could count fingers at two feet. The left orbit was carefully examined, but no source of irritation could be found, nor were the deep tissues tender. He had not worn an artificial eye so there were no excoriations of the conjunctiva.

The man was put to bed and rapidly ptyalized, when the inflammation began to disappear and the vision returned. The improvement continued ten to twelve days when he had a relapse, and in spite of all that could be done the disease went on to complete and permanent blindness.

The trouble was, in my opinion, an irido-choroiditis, evidently sympathetic, and can be only explained by the supposition that, septic bacteria were in the optic nerve sheath at the time of the operation.

Those who are followers of Deutschmann may use this case in support of his theory, whilst his opponents may suggest an error in diagnosis. But, since this man had no constitutional disease, and the character of the inflammation was so unlike that of ordinary iritis with which we are familliar, I think I may safely report it as a case of sympathetic ophthalmia, not unlike that recorded by M. Trousseau * in the Transaction of the Paris Ophthalmological Society.

Case II. John H , an employee of the Missouri Pacific R. R. Co , consulted me in December, 1892. The man had an acute inflammation of the left eye, following a blow on that eye which he had received three or four weeks before from a piece of stone. Prior to the accident the eye was blind for it had been destroyed by disease in childhood, probably purulent ophthalmia.

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* Un cas d'ophthalmie sympathique malgré la resection du nerf optique. Receuil D'Ophtalmologie, April, 1891, page 231.

When I saw him his blind eye was very painful and the inflammation evidently involved the cornea, iris and ciliary body, but, because of the old leucoma, the exact condition could not be determined. From the history of the case and the general appearance of the eye I feared sympathetic ophthalmia although at the time there were no symptoms of inflammation or irritation in the good eye. I advised immediate enucleation, but the patient refused an operation. Then I attempted to reduce the inflammation with atropia and warm applications; all seemed to go well for a few days, when suddenly the second eye became inflamed. There was no marked iritis, but evidently a cyclo-choroiditis. There was pain, congestion, photophobia and a *most extraordinary decrease of the intra-ocular tension*, it being difficult to feel the eye through the lids. The anterior chamber was clear, but the vitreous was too clouded for ophthalmoscopic examination. When I first saw this patient there was no perceptible trouble in this eye; the vision was then normal. Of course the exciting eye was immediately removed and a most energetic treatment started. A large fly blister was put on the back between the shoulders, and small doses of calomel and opium given every two hours until the gums were quite sore, when the mercury was continued by inunction, the object being to push the drug even to salivation if necessary, for the case was desperate and profound medication required. Three days after the outbreak of the disease the eye was even softer and the blindness complete; the light of a lamp could be seen but not located. At no time was the iris inflamed; atropia kept the pupil moderately dilated. Ten days after an improvement in the tension was observed, and the light from the window of the room could be seen. This improvement continued; the inflammation disappeared; the tension came up to the normal and the vision returned. He left the hospital soon afterwards well.

Before the patient was discharged, I carefully examined the interior of the eye, but could not see that the retina or choroid were damaged.

The remarkable points in this case are: the recovery and the unusual decrease of the intra-ocular tension.

There is every reason to believe that this was a case of ophthalmia migratoria. The suddenness of the attack, the limiting of the disease to the posterior half of the eye, and the fact that the mercury cured it, are evidences in favor of its septic nature and against a nervous origin.

# A REPORT OF TWO CASES OF SERIOUS INJURY OF THE CILIARY BODY, IN BOTH OF WHICH THE EYES WERE SAVED IN GOOD CONDITION AND NO SYMPATHETIC OPHTHALMIA OCCURING,

By PETER D. KEYSER, M.D., Philadelphia, Pa.

L. M., æt. 7, May 24, 1892, was struck in the left eye by a piece of flying glass making an incision through the sclera, at the inner side about the middle of the globe, extending downward and outward 1½ *cm* from the limbus conjunctivalis and through the ciliary body. A large bead of vitreous was projecting, and six or eight eye-lashes were lying one-half in and one-half out of the eye-ball. There had been a loss of vitreous as shown by the iris being very much depressed. Pupil shows greyish mass in the centre. Fundus gives bare pink reflex, but no details. Tension, no resistance. Light perception. Wound in conjunctiva ragged and in same direction as that in the sclera. The eye was washed well out with sublimate solution and scleral wound stitched together, taking care not to pick up the uveal tunic. Antiseptic bandage applied. Every thing went well. The sutures were removed on the fifth day. June 22, he was discharged well with vision $\frac{6}{6}$.

R. G., æt. 33, Oct. 22, 1893. A piece of steel 1 inch long, $\frac{1}{4}$ inch thick, $\frac{3}{8}$ inch broad, flew from a fire-box and struck the L. E. cutting through the cornea, sclerotic and ciliary body at the upper and inner part, and into the lens. Iris prolapsing. Two days after came to my clinic in the Wills Eye Hospital, and I removed the prolapsed part of the iris.

The wound in the sclera still gaping, a few days after I stitched the edges of the wound, using a very fine curved needle and iron dyed silk sutures, care being taken in passing the needle through the sclera that the ciliary layer was not picked up and sutured. After this the wound healed readily and the lens became absorbed, leaving an opaque capsule attached to the corneal cicatrix, which was later cut through with a Hays' knife. The iris was drawn somewhat towards the cicatrix and necessitated a partial iridectomy outward On his discharge from the hospital Dec. 30, his vision was, with $+ 10, = \frac{6}{60}$.

The danger of sympathetic ophthalmia arising from an incision of the sclerotic and ciliary body has been considered so great that enucleation has always been recommended in these cases as soon as possible after the injury, even if there be comparatively good sight at the time in the eye. Thinking it best to be on the safe side I have as far as possible carried out this recommendation, even when having a mental protest against such procedure in many cases. Since the bacteriological examination and studies have shown that sympathetic ophthalmia arising from such injuries, is caused by the introduction of micrococci in the wound from the instrument creating the injury, and the presentation to the profession the past few years of the antiseptic treatment of wounds, it occured to me to try this method in the above described cases and see if a useful eye could not be saved in each case. In cleansing, the eyes were really floated in the sublimate solutions, that its action could be had in the wounds; and the success has been so perfect that I feel constrained to present the facts with the hope that many more eyes may be saved in comparatively good, if not perfect, condition, under the same treatment.

# VERTICAL NYSTAGMUS OF ONE EYE CURED BY SHORTENING THE SUPERIOR RECTUS MUSCLE.

By J. W. SCALES, M.D.,
Pine Bluff, Ark.

Miss B., age 19 years, called at my office on 18th of last November, with nystagmus of left eye, it moving only in the vertical direction.

I noticed when the right eye was closed the movement of left eye would cease, and if she was looking at an object 20 feet distant, and suddenly closed the right eye, she would move her head back slightly in order to fix left eye upon the same object.

Her father had consulted an oculist a few years before, and was told nothing could be done for her. At that time she felt very indifferent about having any thing done for it, as it never troubled her any, but now she was thinking of getting married, and was willing to consent to most any treatment, for a cosmetic effect only. I of course felt anxious to help her along in the matrimonial line as much as possible. So I very readily promised her that I would do all I could for her, telling her at the same time that there was something quite unusual about the case, and that I had only seen one other similar; that I believed in her case it could be cured. I placed a candle at a distance of 20 feet and tried in several ways to produce the light with each eye at the same time, but could not succeed until I caught hold of the conjunctiva above the cornea with a pair of forceps and gradually pulled the eye upwards until it came nearly in line with the other eye.

In order to fix the eye in that position I first ran a rough thread under the superior rectus to produce enough iritation to make adhesion certain, then I folded the muscle upwards and fastened it by a thread run through it and tied. I then placed a double prism before right eye, and red glass before left eye, there was hyperphoria one degree, and esophoria of three degrees, remaining uncorrected. After two weeks, headache began to appear which was almost unbearable after third or fourth day. I advised the use of only one eye by placing a bandage over the right.

After five weeks I found the left eye had again fallen so as to throw the light of candle 6° above the other light. Headache would occur in less than an hour after removing the cover from the other eye. In placing the red glass before left eye the nystagmus would make its appearance, an increase of 4° of cataphoria and partial relief of headache occured. I again shortened the superior rectus, leaving a slight esophoria. After the third day I allowed her to use both eyes. I saw her on the first of February and 15th of February; there had been no sign of nystagmus nor headache since the second attempt to shorten the superior rectus. There is not a perfect equilibrium of all the muscles, but she experiences perfect relief with glasses Right + 1.25; Left + 1.00 ⊂ + .25 cyl. ax. 90°.

# THE OPHTHALMIC RECORD,

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## AMERICAN MEDICAL ASSOCIATION.

The profession in San Francisco have been very active in their preparatory work, the result of which will be that the meeting in June will be one of the most pleasurable that the Association has ever had. The success of the scientific feature will depend largely on what the Chairmen and Secretaries of the Sections have been doing since the adjournment in Milwaukee last June. Although we have not seen the programme, we are sure that the

### SECTION OF OPHTHALMOLOGY

this year will compare, in good work well done, with any one of the former meetings. We know that Chairman A. R. Baker and Secretary L. H. Taylor have been active in the interest of ophthalmology. In the next issue of this Journal we will be able to publish a list of the papers promised, and feel safe in saying, before-hand, that it will be a good one.

In compliance with a resolution passed at the Milwaukee meeting, one entire day will be devoted to the study of ERRORS of REFRACTION, one of the most important studies in ophthalmology. The remaining three days of the meeting will be devoted to miscellaneous subjects, and we happen to know that one of these will be HETEROPHORIA.

It takes time and costs money to attend these meetings, but both are well spent on the part of any one engaged in any branch of medicine. The Oculist can ill afford to remain at home though he live in Main and the place of meeting be in California.

As in former years, so in this, the *Record* will publish abstracts of all the papers to be read in the Section of Ophthalmology, when procurable, and will be able to present the discussions in full.

## MYDRIATICS IN HYPEROPES

Will bring immediate comfort when there is exophoria but will cause discomfort when there is esophoria. Such a statement can be confidently made to all patients, for it will be verified by the results. The explanation is easy: as accommodation is being suspended retinal images become more or less blurred; the guiding sensation in the retina calls on the center of accommodation for an impulse to be sent to the ciliary muscle; the impulse comes but the muscle is in a state of forced quietude; another call is made and a more powerful impulse is sent to the sleeping muscle, and so on for an indefinite time; and each increasing impulse sent to the ciliary muscle is associated with a corresponding and consequent impulse sent to the internal recti. In this way the weak internal recti in cases of exophoria are made stronger, and the more easily balance the action of the too strong externi; while in esophoria the already too strong interni are made still stronger by excessive nerve-impulse and the too weak externi cannot so easily balance the too strong interni; hence the comfort that the mydriatic brings in the one case and the discomfort that is excited in the other.

While all of this can be known by the operator before-hand and can be told to the patient, the practical point deduced is: a myotic, preferably a solution eserine, should always be instilled into hyperopic esophoric eyes after the work of refraction has been completed; while in exophoric cases the mydriatic should be allowed to slowly lose its effects. The result aimed at is the temporary comfort of the patient.

Material for publication in the *Record* has been so abundant for the past few months, there has been no room in its pages for the expression of editorial opinions. Even now the Editor feels that he is about to occupy space that he ought to give to some one of his valued contributors. There are some things, however, that he must say now, else be too late in saying them; and first he would speak of the coming meeting of the

## HONOR TO WHOM HOROR IS DUE.

In the next issue of the *Record* we will reproduce a part of a paper published by Dr. A. B. Norton, of New York, in 1890, the subject of which is "Can Headaches and Asthenopia, Resulting from Hyperopia, be Relieved without Glasses?" The reason for this is that he then gave expression to some thoughts embodied in a paper of our own and published in No. 11, Vol. II of this Journal.

The writer regrets that he knew nothing of Dr. Norton's views as to when convex glasses should be given to hyperopes and when not, as it would have saved him many a blunder from 1890 to 1893. During the early part of the latter year his observations, independent of help from other workers, led him to formulate rules for the prescribing of both convex and concave lenses, which were given to the world in the paper entitled "The Relationship between the Centers of Accommodation and Convergence". These rules will be reproduced in connection with proper extracts from Dr. Norton's paper, in our next issue.

## "BASE INGRATITUDE."

Some months ago Dr. L. Webster Fox, of Philadelphia, was sued by one H. L. Hershey for the loss of an eye following a needling operation for soft cataract. The Doctor's friends will congratulate him because of the righteous judgement of the Judge.

In granting the non-suit Judge Biddle said: "I do not see the slightest evidence in this case of any malpractice whatever. This man was attended for eight years and a most serious operation performed on him, and he had paid the doctor $10. In addition the doctor attended his wife and gave him prescriptions for other matters, and I think it is a case of base ingratitude for the services that were rendered. I grant a non-suit."

## THE INTERNATIONAL CONGRESS OF OPHTHALMOLOGY

Will meet in Edinburgh, Scotland, August 6 to 9 next. American Oculists who expect to attend and participate, should so notify Dr. G..A. Berry, of Edinburgh, who will see that proper arrangements will be made. The meeting promises to be one of great importance. The editor of this Journal expects to be present and would be glad to see scores of his American confreres there. Who will go? Why not go in a party?

## PEROXIDE OF HYDROGEN IN MARGINAL BLEPHARITIS.

Personally we feel indebted to Dr. S. C. Ayres, of Cincinnati, for his valuable suggestion as to the curative effects of peroxide of hydrogen in marginal blepharitis. Since getting the hint from Dr. Ayres we have used Marchand's preparation with most gratifying results.

The applications are made once or twice a day among the roots of the lashes by means of pledgets of cotton on the end of a tooth-pick.

## A WEEK IN SKIASCOPY,

Commencing April 9th. at the Philadelphia Polyclinic, will repay those not already skilled in this valuable objective method of determining errors of refraction.

THE

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# ASTIGMATISM FOLLOWING CATARACT EXTRACTION AND OTHER SECTIONS OF THE CORNEA,*

BY EDWARD JACKSON, A.M., M.D.,

Professor of Diseases of the Eye in the Philadelphia Polyclinic;
Surgeon to Wills Eye Hospital.

PHILADELPHIA, PA.

In his work on the Anomalies of Accommodation and Refraction of the Eye, Donders stated "to the very ordinary causes of altered, and consequently irregular arching of the cornea, belongs the extraction of cataract. Especially when prolapsus iridis or threatening prolapsus has existed, whereby the pupil has lost its central position, or where, with forward projection of the flap, the wound surfaces do not perfectly correspond, we seldom obtain a complete arching of the cornea. If the deviation is slight, the power of vision may still be quite sufficient; but on accurate investigation it now appears that the acuteness is defective, and the astigmatism is in this instance also partly capable of correction by giving an oblique position to the convex glass, or by combination with a cylindrical one".

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*Read in the Section of Ophthalmology, Pan-American Medical Congress.

Since the publication of Donder's work, almost every text book upon the refraction or diseases of the eye has contained an allusion to the subject, but these allusions little more than call attention to the existence of such astigmatism.

A few papers upon the subject have appeared from time to time but as far as I know, only one in the English language, viz., that by Dr. Swan M. Burnett in the *American Journal of Ophthalmology* for 1889, p. 361. In view of this it seems worth while to here record some observations as to the clinical history of such astigmatism.

FREQUENCY. It appears to occur almost universally after cataract extraction. In a few of my earlier cases, my notes do not show that it was detected. But in none of these cases was full vision, or nearly full vision obtained; and they were not subjected to careful study with the ophthalmometer or the shadow-test, so that their negative evidence is not conclusive.

In forty-eight cases that have been carefully studied the amounts of astigmatism present were:

Less than 1. D. in 5 cases.
1. to 1.75 D. in 6 cases.
2. to 2.75 D. in 18 cases.
3. to 3.75 D. in 10 cases.
4 to 4.75 D. in 4 cases.
5 D. in 2 cases.
6, 7 and 8 D. in each 1 case.

From these statistics I am inclined to think that those who have found it frequently absent have failed to note it as I did in the cases previously mentioned, because it was not looked for carefully enough. It would appear from these figures not only that it is present in an amount that can be detected, but, also that in a great majority of cases it is present to such a degree that its correction is a matter of considerable importance.

### DIRECTION OF THE PRINCIPAL MERIDIANS.

All writers who have alluded to this subject have noted, what is shown in my cases, that contrary to the rule, the principal meridian of greatest hyperopia was at or near the vertical: the section being made either upward or downward. This has been so generally observed that we may take it as settled, that the meridian of greatest hyperopia is usually or always perpendicular to the center of the corneal incision.

In many of my own cases the slight difference in height, between the puncture and counter-puncture, clearly influenced the inclination of the principal meridians. The greatest departure from such a position of the principal meridians was in the cases presenting low degrees of astigmatism. In one case of astigmatism 0.5 D, the flattest meridian was found 5 degrees from the vertical. As to the explanations of the direction of the astigmatism, as well as of its occurrence, more will be said later.

### SEAT OF ASTIGMATISM.

After cataract extraction, this can only be on the surface of the cornea, and in cases of iridectomy also, the ophthalmometer has invariably revealed that the asymmetry had a similar location.

### TIME OF APPEARANCE AND CLINICAL HISTORY.

The first application of accurate methods for the measurement of refraction, subsequent to the operation, has invariably revealed astigmatism present; and in the highest degree exhibited at any time in that particular case. Inspection of the cornea with or without the use of the Placido disc, from the date of operation, shows that after the effects of cocaine have passed away and the humors have replaced the extracted lens, the form of the cornea remains normal, although subject to changes by changing pressure from the lids until the anterior chamber is re-established. Then in the course of two or three days, or sometimes in a few hours, the corneal asymmetry becomes evident and quickly reaches its maximum. From this time on the tendency is for the astigmatism to diminish until at length a permanent condition is reached. This diminution, however, is not always regular or constant, as was well illustrated in many of the cases, for example:

Mrs. J. M., aged 54, iridectomy for sub acute glaucoma, corneal section upward, well back in sclero-cornal junction, involving one-fifth its circumference.

The eye was operated on May 14, 1883. It had previously been carefully examined and found hyperopic 2. D. and free from astigmatism. The astigmatism was evident shortly after the operation. In five weeks it had markedly diminished, and + 4. D. cyl. axis 25°, gave vision equal $\frac{4}{6}$. At nine weeks there had been no change whatever in the refraction, and the cylinder was ordered for distance with + 3. sph. added for reading. Sixteen days later she wrote me complaining that the glasses had begun to hurt her eyes, and was instructed to discontinue their use. At fourteen weeks the refraction was again carefully tested and found to require for its correction + 2. sph. ⊂⊃ + 2.50 cyl axis 20°. Four years later she required + 2.75 sph. ⊂⊃ + 2.50 cyl. axis 13° and with it obtained vision $\frac{4}{4}$ partly. There was no further change in the refraction when last seen, more than eight years after the operation.

In watching cases from week to week with the ophthalmometer, it has repeatedly happened that, for some weeks, the change in the astigmatism would be but slight and then there would suddenly occur a rapid change to what proved to be the permanent condition. On the other hand there will, in some cases, be a steady diminution of the astigmatism from the time it is first measurable until the permanent condition is reached. Thus:

R. C., aged 63. After simple extraction, upward section in the margin of the cornea, had at fourteen days, astigmatism 15. D. convex cyl. axis 155°.

At 21 days, 13. 5 cyl.
At 40 days, 11. cyl.
At 54 days, 7. 5 cyl. Now axis 157.
At 61 days, 7. 5 cyl.
At 75 days, 5. 75 cyl.
At 78 days, 5. cyl. Axis now 158.
At 90 days, 4. cyl. Axis 158, giving vision $\frac{4}{5}$, mostly.

In nearly half of my cases capsulotomy was performed while the patient was under observation. No effect from it upon the astigmatism present could be noticed.

### FINAL AMOUNT.

The amount of astigmatism remaining when its condition had become permanent is indicated in the table given in connection with its frequency. It should, however, be noted that all cases in which the astigmatism is given as over 4. D. were cases that have not been seen more than five months after the dates of operation; and of the cases showing 4. D. but two were seen more than six months after the operation, so it is uncertain whether in any case more than this amount of astigmatism has remained permanently; although some of these cases are known to be within reach and all were directed to report if their glasses became unsatisfactory. The one in which the astigmatism was 8. D. was seen only one month after operation. It is certain that in the large majority of cases the amount of astigmatism diminishes to less than 3. D. before it becomes fixed; and in a given case where it was necessary to adjust glasses within the period of probable change of astigmatism, it would be safer to prescribe for this average amount than to take the measurement of the eye at the time, if it indicated a higher amount, even though this might have been almost or quite constant for days or weeks.

## WHEN IT CEASES TO CHANGE.

The period during which the astigmatism continues to diminish varies widely. In two eyes it decreased from 4. D. to 2.25 D. after a period of six months had elapsed. In another case it had fallen to 2.25 D. by the 22nd. day and no farther change occurred, although the eye was seen for more than a year afterwards. In another case, it diminished to 1.25 D. by the 25th. day and remained without the slightest change five years later. In still another it fell to 1. D. by the 23rd. day. In about 60% of the cases the change continued between two and three months. Where the amount remains high at the end of that period, even though it had been for a considerable time stationary, there is strong probability that it will farther diminish later.

All of the cases long under observation, two of them for ten years, seem to show that after a certain period, limited apparently to the first year, or possibly a little longer, the amount of astigmatism becomes quite fixed and is as little liable to change as in cases of moderate astigmatism not due to operation.

## INFLUENCE OF COMPLICATIONS.

The occurrence of prolapse of the iris or of incarceration, or even of close adhesion of the iris to the corneal stump, notably influences for a time the amount, and delays the diminutition of astigmatism, but these conditions appear to produce but little effect upon the final amount and permanence. The influence of prolapse in this direction, unless it be so extensive as to cause great displacement of the corneal flap, is not greater than the influence of incarceration or of adhesion of the iris to the cornea. In either case the influence appears to be proportioned to the extent to which the corneal wound is involved. Thus, a large incarceration is worse than a small prolapse.

In the series of cases upon which this paper is based there occurred two of extensive prolapse of the iris allowed to shrink without excision or other operative interference.

W. J., aged 70, by a sudden movement of the eye during the corneal section, caused a doubling of the incision that left about one-third of the margin of the flap hanging as a shaving of corneal tissue, almost completely severed from its connections. This underwent partial absorption, delaying healing of the wound: and the restlessness which had caused the original accident, secured an extensive prolapse of the iris. On the 26th. day he still had 10. D. of astigmatism, which, however, had diminished to 3.50 D. by the 77th. day, and after that underwent no change.

J. W., aged 42, had a bit of steel lodged in the lens four months previously. The lens was much swollen and in order to make sure of the removal of the foreign body, a long incision well back in the sclero corneal margin was employed. Prolapse of the iris occurred and extended until it occupied the whole length of the wound. It reached its maximum in a few days and then remained without notable change in bulk for thirty days, after which it flattened rapidly and by the 45th. day had gone down entirely to the level of the cornea. On the 51st. day the astigmatism was 20. D., on the 58th. day 11. D., at 65 days 9. D. and only after five months has it reached 5. D. In contrast to this is the astigmatism in the following case:

Mrs. J. G. B., aged 64, simple extraction, normal healing. On the 25th. day, astigmatism 26. D., on the 28th. day it had fallen to 23. D. and in two months and a half to 0.75 D.

The number of diopters in this and the following case are what was indicated by the Javal ophthalmometer, considerably higher than the convex cylinder accepted. Thus when the ophthalmometer showed 11. D., the 10. D. cylinder was chosen; when it showed 23. D., the 18. D. gave best vision. This is partly because of the distance of the cylinder in front of the eye, and partly because the constants taken as the basis of the graduation of the Javal instrument do not hold for the eye rendered aphakic by cataract extraction. (See paper by Dr. Carl Weiland, Archives of Ophthalmology).

### NATURE OF THE CHANGE IN THE CORNEA.

The readings of the ophthalmometer show, first that the corneal curvature is actually diminished in the meridian of least refraction, usually vertical or nearly so, and that this meridian is flattest at the first examination and becomes more convex as the astigmatism diminishes. Second, the meridian of greater curvature, usually horizontal, or approximately so, presents an actual increase over the previous curvature of the cornea: which increase is greatest at the first examination and diminishes with the astigmatism, sometimes, but not always, passing away altogether by the time the condition of permanency is reached.

To explain these corneal changes, the pressure of the lids, the displacement of the flap, and the action of the extra-ocular muscles upon the globe, have all been involved, but the astigmatism occurs, typical in form and course, when the flap and stump unite in perfect coaptation, and the pressure of the lids, and the action of the extra-ocular muscles have not been shown to differ essentially from their pressure and action on the normal globe.

It seems to me that the explanation of the phenomena of postoperative astigmatism is to be found in the essential fact of an incision through the resisting coat of the eye, temporarily entirely destroying its resistance along a certain line, and that the necessary effects of such an incision, irrespective of any outside influences, are just such as we have observed in the cases in question.

With the incision the resistance of the sclero-corneal coat to the intra-ocular tension, along the line of incision, drops to zero and remains there until the flap and stump adhere. During this time that the wound remains open, the intra-ocular tension also remains at zero and no displacement results. When, however, the wound is closed, the intra-ocular tension is immediately renewed and the adhesions uniting the flap and stump become a portion of the sclero-corneal coat, which has to resist this tension.

Throughout most of this coat, the power of resistance is normal; the adhesions possess comparatively little power of resistance and the changes in the neighboring margins of the flap and stump incident to the process of repair materially diminish resistance. It follows, therefore, that we have along the line of incision less resistance to the intra-ocular pressure than at any other portion of the sclero-corneal sac; necessarily the parts where the resistance is less protrude. This protrusion causes great increase of curvature in the direction perpendicular to the incision at the line of incision; and this increase of curvature must necessarily be made up by an equal amount of flattening of the neighboring portions of the cornea and sclera. In the sclera this, being of no practical importance, remains unnoticed. In the cornea it causes the flattening of the vertical meridian. So much for the flattening in the meridian perpendicular to the incision.

It is noticed that the change of outline that occurs is dependent on the bulging of the point of least resistance. The maximum of this bulging will be at the center of the corneal incision, that is, the center of the corneal incision is more pushed out from what would be its normal relation to the center of the globe than any other point of the sclero-corneal coat; and the whole area of the central part of the flap shares more or less in this bulging. We have, therefore, the center of the upper part of the flap bulging forward. If other parts of the circumference of the cornea remain fixed, as the whole cornea does outside of the region of incision, and as the angles of the incision do, to a less extent, because of the support they receive from neighboring firm tissue, this bulging at the upper margin of the cornea causes the cornea to assume more or less the form of a vertical ridge, comparatively flat in the direction of its length, but with increased curvature from side to side. And, in this increase of curve, to get over the ridge as it were, from side to side, we have the cause of increased curvature in the meridian of greatest curvature.

This explanation is put forward not as an hypothesis but as an application of perfectly understood physical laws to the special case of intra-ocular tension, resisted by the sclero-corneal coat, weakened along a certain line of incision; and seems to me entirely adequate to the requirements of the phenomena in question, rendering unnecessary any appeal to other special causes to explain post-operative astigmatism.

As the resistance along the line of incision increases with the return of the tissues to normal, the tendency of intra-ocular pressure is to reproduce the normal spherical curves, or the spherical curves of the normal eye. That it should fail of doing this completely is not to be wondered at when one considers the existence of the permanent scar and the comparative rigidity, on account of the age of the patient, of the tissues in which this process generally occurs.

The influence of such complications as prolapse or incarceration of the iris is clearly traceable to the fact that they produce softening in the adjoining margins of the flap and stump and delay their return to the condition of normal corneal tissue.

## CHOICE OF OPERATION AND AFTER-TREATMENT.

The hope has been expressed that with an increased knowledge on the subject of post operative astigmatism, we would be able to choose or devise some special form of operation that would reduce it to a minimum or prevent it entirely. But if the cause lies in the essential fact of an incision into the cornea that necessarily lessens its resistance. This hope will have to be abandoned. All we can do in the choice of an operation will be to keep the incision out of the visual zone of the cornea, and to secure prompt and complete healing.

The thought will occur that if the bulging could be prevented by the proper outside pressure, the astigmatism would be prevented. But, as I have already urged in a paper before the American Medical Association in 1891, any such application of pressure is impracticable and the attempt certain to be injurious.

Where prolapsus or incarceration of the iris has occurred the removal of the involved iris may hasten the condition of permanence, but will not diminish the ultimate amount of astigmatism sufficiently to justify a resort of it on that account.

## THE CORRECTION OF POST-OPERATIVE ASTIGMATISM.

Many of those who recognize its existence speak of it as unimportant, or to be corrected not by a cylindrical lens, but by the placing obliquely of a spherical lens.

The need of the improvement of vision gained by the correction of 1, 2 or 3 D. of astigmatism is as great for a patient who has undergone cataract extraction or iridectomy, and so speedily acquired the astigmatism, as for a patient in whom the astigmatism is congenital, or slow of development.

The imperfect visual acuteness often present in the former class of patients is, I believe, more than balanced by the fact astigmatism is new to them. Even if its correction will not give as good vision as may be obtained by the correction of the same congenital astigmatism, the fact that the patient has been accustomed to seeing without astigmatism will cause him to appreciate as highly the relief afforded. In any case of cataract extraction that can be properly classed as successful, it seems to me important to correct the astigmatism.

Now as to the method of correction: Theoretically, it is true that, by looking obliquely through a strong spherical lens, regular astigmatism may be corrected, but as I pointed out in a paper read before the American Medical Association in 1887, on the effect of obliquity of correcting lenses, such a correction is far less satisfactory and far less beneficial than the correction by the ordinary cylindrical lens. The proper cylindrical effect is only obtained at a certain angle and at an angle where the slightest deviation either way produces a perceptible change in the cylindrical effect, so that the patient who gets his cylindrical effect by looking obliquely through a spherical glass is constantly getting instead of the proper effect, not enough or a little too much.

On the other hand, with the cylindrical lens, and the visual axis perpendicular to the lens, there is a considerable angle on either side of the perpendicular through which the change of cylindrical effect is imperceptible; and on this account, if the lenses are properly mounted, it becomes difficult for the patient to get a cylindrical effect which will be seriously incorrect.

One other point: the reason urged for not employing a cylindrical surface upon the cataract glass is that it renders necessary the use of a more convex spherical surface, increasing the weight of the lens and the amount of spherical aberration. The increase of weight in a plano-spherical over a double convex that is absolutely necessary, is so slight as to be of no practical importance. The increase that happens in the use of such lenses in practice depends on the inferior selection and grinding of the lens by the optician. The spherical and chromatic aberration of even a strong cataract glass, especially through the small pupil obtained by simple extraction, are not the most serious defects in a strong lens. The effect of looking obliquely through the lens is of much greater practical importance. And by placing the spherical entirely on one surface, if convex the surface away from the eye, we secure an approximation to the ideal periscopic lens, one which should have the center of its refractive surface at the center of rotation of the eye-ball, and reduce to the minimum the effects of looking obliquely through the refracting surface.

Indeed so important is this matter that where the cylindrical lens was to be employed in connection with the strong spherical. I have used the concave cylindrical with the convex spherical, turning the former toward the eye, the latter from it; and have found such a lens as satisfactory, or more satisfactory, than those made with both spherical and cylindrical surfaces convex.

The teaching of the non-correction of astigmatism after cataract extraction seems to me utterly opposed to good sense. And practice based upon it is only excusable on the ground of an insurmountable constitutional indisposition to do thorough work.

# COMPLICATIONS OF CATARACT EXTRACTION AND SUBSEQUENT HEALING,

—BY—

GEORGE. E. de SCHWEINITZ, M.D., EDWARD JACKSON, M.D.,
SAMUEL D. RISLEY, M.D.,
Professors of Diseases of the Eye in the Philadelphia Polyclinic.

Remarks made in a Conference during the special week on Cataract.

Dr. de Schweinitz believed that, irrigation of the anterior chamber is usually unnecessary and it is sure to be followed by disastrous results if an antiseptic other than boric acid be employed. This is particularly the case with bi-chloride of mercury, used even in so mild a strength as 1 to 10,000, which, according to the experiments of Mellinger, Nuel and others, is capable of originating opacities in the corneal endothelium. If after a careful freeing of the wound and the anterior chamber of cortical opacities, irrigation is considered advisable, two solutions are safe: namely, luke-warm boric acid solution three per cent. and similarly warm one-half per cent. solution of sodium chloride in distilled water properly sterilized. He referred to the advantage of Lippincott's syringe under these circumstances, and also to a model employed by Dr. Risley.

In summing up the accidents which might occur during an extraction of cataract, Dr. de Schweinitz referred, first, to the introduction of the knife with the cutting edge turned in the wrong direction—an accident which he characterized as inexcusable, but believed that, if it occurred, the knife should be withdrawn and the operation postponed until the anterior chamber had refilled. Second, the distension of the conjunctiva in the neighborhood of the counter-puncture with the aqueous humor forming a large bleb, an accident, usually due to some unsteadiness of the hand or pressure with the forceps, and which should not deter the operator from completing the section in the usual manner. Third, the falling of the iris before the knife. The section should be completed and the irregular coloboma which is thus produced, afterwards trimmed with the iris-scissors. Fourth, too small a wound to permit the proper expulsion of the lens. Under these circumstances the incision should be enlarged with a pair of probe pointed scissors. Fifth, partial or complete dislocation of the lens, which should be removed, with the loop, although if the luxation is partial, the experiment of first closing the eyes for a moment or two with a light pressure bandage in the hope that the lens may right itself, may first be tried. Escape of vitreous is the signal for the removal of all pressure, and if the lens has not yet been extracted, its rapid removal, and closing of the eye without unnecessary manipulations in its toilet.

Insufficient capsulotomy was also mentioned and the occasional free hemorrhage from a wounded conjunctival vessel, or, if iridectomy is performed, from the cut margin of the iris. It was also pointed out that the immediate results of escape of vitreous were not always evil, and that excellent visual results might accrue after a very considerable loss of vitreous, the great difficulty being that subsequent traction of this body may produce detachment of the retina, or that opacities may form within its substance.

He also described the collapse of the cornea which may occur particularly in old and thin subjects, sometimes as the effect of a misplaced section, and sometimes from inherent relaxation of the tissue—an accident of little moment if the section had been completed, but awkward if occurring in the midst of the cutting process. Under the latter circumstances, slight pressure should be made upon the lower portion of the eye-ball, when the normal convexity of the cornea would reappear and permit a smooth completion of the operation.

Referring to anomalies in the healing process, Dr. de Schweinitz spoke of pain as presaging intra-ocular hemorrhage, suppuration of the wound, prolapse of the iris, or iritis, provided this pain was severe, and not the ordinary slight pain common for several hours after an ordinary extraction. In prolapse of the iris after simple extraction this pain was usually sharp, lasted for an hour, and then disappeared. In iritis, which was common about the fifth day, but sometimes delayed until the tenth day, and which might be caused either by imperfect toilet of the wound, too early exposure to light, or by a septic process less virulent than that which, under other circumstances, was capable of originating suppuration, the pain was in all particulars like that usually associated with inflammation of this membrane from other and constitutional reasons, which could also obtain after extraction.

The treatment of iritis he believed to consist in the free instillation of atropia, the occasional use of hot compress, and, if the general condition of the patient permitted, free leeching from the temple. The usual alterative and tonic treatment was equally well indicated. The infrequency of suppuration of the wound under present methods was commented upon, and Dr. de Schweinitz quoted the statistics of Collins that this was more common in old people than in young, that the tendency was greater between the sixtieth and seventieth than between the seventieth and eightieth years, although it was greater between the eightieth and ninetieth than between the sixtieth and seventieth years. Its relation to lachrymal complications, microbic inflammation of the respiratory tracts, conjunctivitis, imperfect asepsis, and finally, malnutrition, were described. The treatment was believed to consist in hot compresses, antiseptic irrigation and cauterization of the wound. The researches of Darier and his belief that subcutaneous injections of bichloride of mercury in the neighborhood of the inflammation were described.

Concerning the operation of simple extraction, Dr. de Schweinitz referred only to two points, namely, the use of eserine immediately after the operation and in the reduction of a prolapse, and stated that much difference of opinion prevailed as to the availability and trustworthiness of the physiological effects of this drug. Personally he believed there was no advantage in the use of eserine, certainly not in the strength of a 1 per cent. solution, when a sixth of a grain to the fluid ounce would suffice and give much less pain to the patient.

He described certain experiments of his own, on rabbits as to the production of eserine-iritis, and stated that he had never been able to originate this in an eye in which the cornea remained intact, although rabbits were singularly susceptible to the influence of the drug. Inasmuch as after a properly performed simple section the coaptation of the parts was such that the eye was somewhat in the position of a normal organ, he had no doubt, as was abundantly proven by the experiences of Jackson and Knapp, that eserine might be employed with safety, but he was convinced if it came in prolonged contact with the iris, especially when used for any length of time by repeated instillations, that hyperæmia of the ciliary body and iritis might result, and instanced the cases of corneal ulcer in which, if eserine did not produce iritis, it at least influenced its development unless proper precautions were taken to neutralize its irritating effect on the uveal tract.

He referred to the various procedures of replacing the iris when it was prolapsed primarily, that is, immediately after the section, and described the method employed by Mr. Lang, in Moorfield's Hospital, who inserted a delicate iris forceps, seized the lower margin of the iris and straightened out the fold precisely as one would fllatten a tuck by grasping its inferior border and drawing it out straight.

DR. JACKSON:

Washing out of the anterior chamber I practice rather for the removal of cortex that has escaped from the capsule than with the hope of getting all cortex out of the eye. My experience agrees with that of others that the leaving of a moderate amount of cortex within the capsule exerts no deliterious influence on the progress of the healing, or the ultimate result of the operation. The worst it can do is to delay the time at which the good result of operation becomes apparent, or to render necessary a secondary operation. I also find in the stream of fluid thrown into the eye by Lippincott's syringe, the most gentle and satisfactory method of replacing the iris and securing the round central pupil in simple extraction. It is a measure that is not necessary in all cases, but which I resort to in the majority. I have never seen cause to regret. The solutions I employ are those referred to by Dr. deSchweinitz, freshly boiled before using, and raised to a temperature of 105°, Fahrenheit.

One of the complications generally alluded to in the books, and one that is really more serious than might at first appear is the making of too small a corneal incision. If it is discovered before the attempt is made to expel the lens, the incision can be extended and no serious trouble will result. But very generally it is not noticed until the lens has been started from its normal position, in which case, if the expulsion of the nucleus can be affected, even with considerable pressure, it is better to go ahead, than to stop to enlarge the incision. After the lens has been once partially dislocated, it is often difficult to again make it present properly in the corneal wound. If the incision has to be extended, you must take care that the additional cut starts from the end of the original incision and that the knife or scissors do not catch one lip of the wound, and, starting from that point make an incision parallel to the extremity of the one already made. This I did in one case, and the loss of the shaving of cornea thus clipped from the flap notably delayed healing.

In regard to the introduction of the knife, with its cutting edge turned in the wrong direction, an accident which could hardly happen with my knife or the Beers knife, but which might readily occur with a narrow Græfe knife; if the knife had been introduced to make a semi-circular flap, the puncture and counter-puncture at the horizontal meridian of the cornea, probably the best thing would be to proceed to make the flap downward instead of upward. But if some modified form of Græfe operation was intended, this would be quite impracticable. It has been suggested to withdraw the knife slightly and turn it. If this be attempted, the back of the knife should be turned towards the iris and lens, and the cutting edge towards the cornea. It can hardly be effected however, without loss of the aqueous, and the completion of the incision will be almost impossible without cutting the iris. Whether it could be practiced at all would depend much on the width of the knife.

Sometimes before the completion of the corneal section, some movement of the patient causes the knife to catch in the iris. If it be the point of the knife that catches and the accident is instantly noticed, a slight withdrawal followed by a prompt pushing forward again of the knife may free it. When the iris falls before the cutting edge during the making of the incision, it may be necessary to cut it, making an irregular iridectomy, which can be straightened out afterwards. But in two out of the three cases in which this accident has happened to me, I have been able, by lifting the knife up from the iris and slightly rocking it, to disengage it and complete the section without injury to that membrane.

Among the complications of healing, we are always on the lookout for any unfavorable condition of the lips of the wound, particularly if the corneal flap. Not unfrequently there appears in from 12 to 48 hours after operation a general haziness, usually confined to the flap or the immediate neighborhood of the wound, but sometimes involving the whole cornea. If this be unattended with other signs of serious inflammation, it should not be alarming. It is no sign that the wound will do badly.

Another condition for which we are always on the look-out is conjunctivitis. Sometimes in old people it is impossible to get the eye entirely free from such inflammation. In many other cases it will appear after the use of an eye bandage, even without operative interference. When it does appear, I usually change from my first dressing, which includes a light pad of gauze and absorbent cotton, to the simple application of strips of gelatine plaster to the lids, the removal of the poulticing effect of the pad lessening the tendency to inflammation. I have, however, seen purulent conjunctivitis developed with such profuse discharge that on the fifth day all dressings had to be removed, and the lids regularly everted for application of silver nitrate, without interference with the healing of the corneal wound.

Doing simple extraction, the complication that we especially bear in mind is prolapse of the iris. There are some cases in which the vitreous seems to show a strong tendency to push the iris forward and keep it in close contact with the wound, so that its prolapse can scarcely be avoided. In a much larger number of cases, however, the prolapse is due to violence to the wound in the eye-ball, either by an accidental blow or by squeezing of the lids. The danger of this is to be especially borne in mind where the eye-ball is particularly prominent and the lids thick and strong, as in the colored race. If the prolapse occur at the time of operation—if upon returning the iris to the anterior chamber, it shows a marked tendency to again and again bulge into the wound, with displacement and distortion of the pupil—it is best to make an iridectomy, since otherwise prolapse is certain When it occurs later, it may be, if very recent, returned to the anterior chamber by stroking of the spatula and the subsequent use of eserine.

If however, it has become adherent to the lips of the wound, it will be better to avoid all active treatment; merely keeping the eye cleansed and comfortable as possible, and allowing the prolapse to run its course. In all cases that I have treated in this way, the ultimate result has been entirely satisfactory. After extraction of the lens, prolapse of the iris does not show the tendency, that we sometimes see after perforation of a corneal ulcer, to enlarge and develop into an anterior staphyloma. For a time it remains distended and may appear by variations of distention to vary in size, but ultimately, after some weeks, it rapidly flattens down, and the cornea assumes as favorable a curvature as is commonly seen after cataract extraction.

To avoid prolapse, I place the incision for a simple extraction entirely in the clear cornea and as far before the iris as will allow a corneal flap of sufficient size. Formerly, I used eserine in all cases, but now where the washing out of the anterior chamber or the simple manipulation of the eye-ball causes the pupil to contract and become central, I omit the instillation of eserine. I think however, that it does have some influence in drawing the iris into a plane; and, removing it from contact with the cornea, tends to prevent it from getting into the corneal wound. The strength of eserine solution that I use is ⅛ or ¼ of a grain to the ounce.

A complication of healing as frequent as prolapse, and having almost the same influence in delaying the return of the cornea to its permanent curvature, is the adhesion of the iris to the wound, or to its upper lip. Such adhesions may be broad, including most of the length of the wound and a considerable area of the iris, or they may consist of one or more threads of exudation that remain stretched from the iris to the corneal scar. Where they cause decided pulling on the iris and were comparatively narrow, I have divided them. But I am not certain that this is necessary in any case.

Adhesion of the pupillary margin to the remains of the capsule is quite common. Generally it causes no trouble, but in some cases it seems to produce a prolonged irritability of the eye, which does not yield to a mydriatic, but is rather increased by it. Such adhesions occur without any marked pain or special discoloration of the iris. The liability to them may be lessened by the instillation of a mydriatic as soon as the anterior chamber is re-established. More pronounced iritis has to be met, and where it occurs within a few days after extraction, the constitutional treatment is of especial importance.

With regard to secondary operations, it is probable that in nearly all cases a successful opening through the posterior capsule will ultimately give better vision. Even where vision is perfect shortly after the operation, it is likely to deteriorate within a year or two through thickening and wrinkling of the remaining capsule. The division of the capsule is most easily accomplished within two months after extraction of the lens; and probably those cases are to be regarded as fortunate in which the secondary operation has been done at this period. Subsequently, the capsule becomes more dense and tough and is more difficult to divide, it must be divided more freely to secure the same opening, and its division produces greater disturbance of the parts to which it is attached.

DR. RISLEY:

As regards washing out the anterior chamber with so called antiseptic lotions, I am fully in accord with the views Dr. de Schweinitz has expressed. I am distinctly opposed to their use. Nevertheless aseptic solutions properly used are frequently very helpful in freeing the anterior chamber of remaining masses of cortical. I prefer for this purpose a half per cent. solution of common salt. This is always boiled. before using, and should always be used warm, the temperature being a trifle higher than the normal temperature of the eye—say 99° or 100°. There is always some shock from cool solutions, and the patient is more liable to shrink from it, or strain than with a warm solution. The apparatus referred to by Dr. deSchweinitz, is the one presented to the Am. Oph. Soc. a few years ago by Dr. Williams of Boston. I prefer however a simple pipette with a very fine point, which is used only for this purpose. The posterior lip of the wound is pressed gently backward with a horn spatula, its point engaging in the wound. The tip of the pipette is placed on its flat surface and the warm salt solution is forced over it into the anterior chamber. If necessary the incision is made to gape by slight pressure on the lower part of the ball. For two or three years I have used this simple method of perfecting the toilet of the eye after extraction, in most of my patients and have not recognized any harm resulting from it. I have occasionally used solutions of boracic acid, but have avoided bichloride and biniodide of mercury solutions. I think they should never be introduced into the anterior chamber.

# THE PLASTER STRIP CATARACT DRESSING NEW AND YET OLD.

By HERBERT HARLAN, M.D.,

Baltimore, Md.

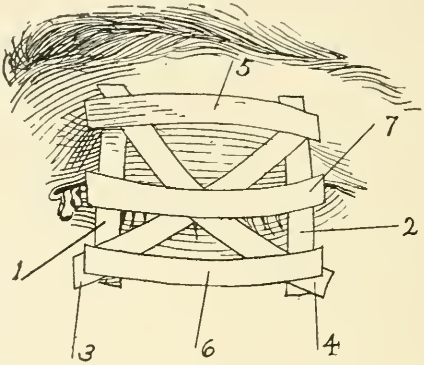
Apropos of Dr. Murrell's article on the simple dressing after cataract extraction, allow me to say that five or six years ago here in Baltimore, we were quite enthusiastic over the use of the plaster strip as a dressing after cataract operations. This dressing served the excellent purpose of calling attention to the fact that close confinement and annoying restrictions were unnecessary in cataract cases. The somewhat curious result is that all the staff of the Presbyterian Eye and Ear Hospital have discarded the strip entirely, and now use a single four tailed bandage over the operated eye only.

The evolution process was about this: in a large percentage of cases, on examination, the day following the operation it was found that one or both eyes were more or less completely open, and this notwithstanding the utmost care in adjusting the strips. Gold beaters skin, isinglass plaster and white geletole plaster, prepared by Johnson & Johnson, were all tried. The latter is the best, but even it wont work well when the lashes are stiff or there is much lachrymation.

Well; the strips had to be readjusted. This was some trouble but did no harm. Nor did the inspection of the eyes do harm, and here was valuable experience. Particularly since the extraction without iridectomy has become the routine operation. On two occasions I have been enabled to reduce a small hernia, and get a final good result with round pupil, and a number of times I have been able to cut short a beginning iritis, which had the eye not been inspected daily could not have been done.

And so, because a light single bandage is much easier to remove and replace at the daily visits, the strip is no longer used. But we are quite ready to give a fair trial to the next good thing which comes along.

But what will probably interest the readers of the *Record*, more is the fact that strips of plaster were used to close the eyes after such operations, previous to 1850. I have an atlas with descriptive text, showing operations on the eyes, by Desmarres and published in July, 1850, which gives a cut which is shown in the drawing.



The translation of the text in reference to this cut is as follows: "The eye is kept closed after the operation by means of little bands of plaster, (taffetas d'angleterre) placed in the order of the figures. One will notice that band 7 is placed half on each of the two lids, and that its inner end leaves open the angle for the escape of tears and mucous, which the engraver has amused himself by representing. It is this same dressing that we employ after all operations, done on the cornea or in wounds of this membrane, in order to obtain a prompt union."

I suggest that those who still use strip dressing, give this method a trial. I tried using a number of strips myself, but gave them up for the same reason that I discontinued the single large strip.

# TWO LENSES EXTRACTED FROM ONE EYE AT THE SAME SITTING.

By A. J. ERWIN, M.D., Mansfield, Ohio.

Miss Rawson, æt. 70, of our city consulted me Dec. 17, 1889, on account of glaucoma of both eyes. O. S. had been totally blinded for two years, and for the past six months had been having frequent inflammatory attacks. O. D. with V $= \frac{10}{80}$ had not reached the inflammatory stage. I made an upward iridectomy in O. S., which gave a respite from pain for about five weeks, after which the attacks became again frequent. Feb. 15, I made a downward iridectomy in the same eye which stopped the attacks until Nobember. December 5, as there was no more iridectomies to be made, I proceeded to extract the cataractous lens of O. S. for the relief of the tension and pain. As usual in glaucoma the anterior chamber was shallow, but there was no apparent dislocation of the lens. After I had extracted the lens, and was making the usual pressure for the removal of what seemed to be apaque cortical substance, to my surprise a second lens came out, identical in size, shape and consistance, with the first, each was 8 *mm* by 2 *mm* and perfect in form, at the center of each was a round roughened spot 2 *mm* in diameter, where apparently they had been connected. The extraction stopped permanently the glaucoma of each eye, leaving O. D. with V. $= \frac{10}{30}$ The common explanation would be that, at one of the iridectomies, I had opened the capsule, but who has ever seen so large a secondary cataract? Is not the case unique?

# HISTORY OF THE DROP-BOTTLE.*

By L. WEBSTER FOX, M.D.,
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Philadelphia, Pa.

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Gentlemen:

It is rather a curious fact that some of the most useful articles used in the many fields of trade, commerce and every-day life, have lost their origin in "the mists of antiquity:" and so it is in many respects the same with articles used by the physician in his every-day practice.

The Drop-Bottle may be cited as an example: who the inventor of this bottle was, is not known; but suffice it to say that very little or no improvement has been made over the Bottle in use at Moorfield's Eye Hospital in London, fifteen years ago. In the last two or three years, quite a number of Bottles have been introduced, each claiming more or less advantage over its neighbor,—the inventor always claiming among other things, originality, antiseptic qualities, and convenience.

As to originality, the latest placed upon the market are faithful copies of the English models—simply because one is made of white glass and another of blue, or one has a longer neck or a larger bulb, does not take away the fact that the last ones are not original. As to their antiseptic properties, this of course is a misnomer. Fluids in such bottles are no more kept free from aspergillus than those which do not claim such qualities. This has been demonstrated in a most careful and thorough manner by Dr. deSchweinitz, of this city.

As a convenience, the Drop-Bottle plays a very important role in the armamentaria of the ophthalmic surgeon. In fact, we should be at a great loss without it. The only question now before us is, which is the most useful and practical kind, and where are they to be obtained?

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* Extract from a Clinical Lecture delivered at the Medico-Chirurgical College, Philadelphia, Pa.

The Drop-Bottle in use at Moorfield's Eye Hospital for the past fifteen years, is represented in Fig. 1. It is a small, bulbous shaped vial, rather wide at the mouth, and through the cork a small glass tube is inserted. The bottle is taken in the hand, turned upside down, and the heat from the palm, expanding the air within the cavity of the bottle, causes one, two, or three drops to be forced into the eye of the patient. Who the inventor of this bottle was, I have been unable to ascertain, but it is supposed to have been invented by a man by the name of Clark. They are made of a uniform size, containing about three drams of the liquid.

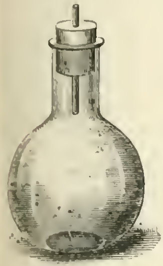
Fig. 1.

No. 2 is a French model--very small—and differs from the English model in the fact that the glass pipette extends from a rubber cap which first sucks, by compression, the fluid into the pipette, whence it is afterwards dropped into the eye. They are made of various sizes, the one shown in the diagram being taken from a small pocket-case suggested by Galezowski. For practical, every-day service, this is not to be commended; it is simply used in a pocket-case.

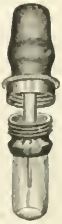
Fig. 2.

No. 3, an ordinary ounce bottle, round, white glass, with a pipette ground into the neck as a stopper. The head is cup-shaped, over which is tied a piece of rubber cloth. The objection to this bottle is, that in a very short time the elastic becomes rotten, and breaks under pressure of the finger. It is not without much difficulty that this cloth is replaced. I brought this bottle with me from England some years ago.

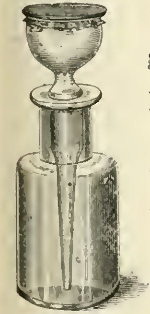
Fig. 3.

No. 4 is after a model recently made by Whitall, Tatum & Co. This consists of an ordinary bottle in which is inserted a glass stopper, which takes the place of a pipette. The head of this stopper is expanded, over which is fastened a piece of india-rubber covering or cap. By pressing this diaphragm, or cap, the air is expelled from the upper air-chamber, and by releasing the finger the fluid is sucked into the vacant space. This model, as will be seen, resembles the English bottle.

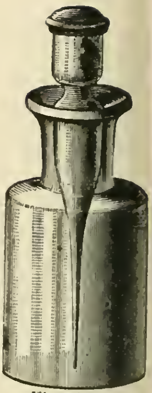
Fig. 4.

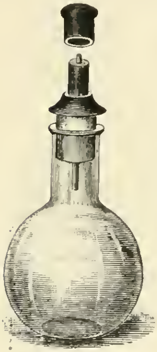
Fig. 5.

No. 5 is by Dr. McNaughton Jones: a bottle shaped very much after the Moorfield's, with a vulcanite stopper; passing through the center of the stopper a pipette with a hard rubber cap covering it. This is supposed to keep the fluid in the bottle free from aspergillus;—it does not do so, however.

This is an English model of practically no importance, as the stopper consists of a solid piece of glass, drawn to a point. The stopper is wide enough to fill the mouth of the bottle, passing down through it to the bottom. The fluid which adheres to the side of the stopper when lifted up, forms at the apex of the cone in a single drop. This is of more value in the denser fluids like boro-glyceride, etc , etc.

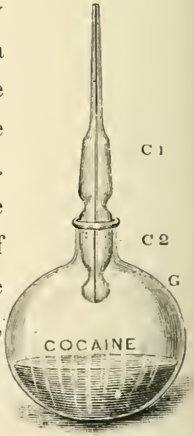

Fig. 6.

I have now in my possession one or two other models, but they are so nearly like the several described above, that it would not be fair to call attention to them. Several ophthalmic cases have recently been put upon the market, with models very like those adopted by the English. They have their practical value. One of the most recent of drop-bottles was introduced by Dr. Stroschein, of Würtzburg, and possesses advantages over those in common use

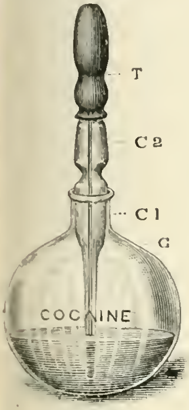

Fig. 7.

No. 7 represents the bottle ready for use. The flask is constructed of thin glass so as to bear heat without breaking. The pipette fits into the flask, and differs from those commonly employed in that it has two bulbs, (C 1 and C 2), instead of one. The pipette, which is of course traversed by a central channel, is surmounted by an india-rubber nipple. These flasks were the first on the market in which fluids could be sterilized, and this is done by heating the fluid over a gas-burner or an alcohol lamp for three minutes. The flask may be held by a wooden clip, or it may be supported by a wire gauze on a tripod. As soon as the boiling point is reached, the steam rises from the liquid and passes through the pipette, which is thus effectually sterilized. In about half a minute from the removal of the bottle from the flame, the pipette is inserted in its original position. The fluid may be thoroughly cooled by dropping the flask into cold water, after putting on the rubber teat; and the bottle is ready for use.

Dr. Stroschein adds eight to ten drops of distilled water to every half dram of the liquid before it is boiled This is done to make up for the waste produced by boiling I brought a set of these bottles (four) with me from Europe last September, since which time I have been using them in my operations; and as a result, in thirty-five cataract operations, five operations for glaucoma, and several iridectomies, I have not met with a single loss of the eye ball, nor any untoward symptoms.

That this process described secures absolute sterilization of bottle, contents, and pipette, is confirmed by Dr. Stroschein, who made more than one hundred bacteriological experiments. For any ophthalmic surgeon who wishes to have a bottle in which he can use a sterilized fluid, I can amply attest to the value of this last one. The few described above, have value (which goes withaut saying) in using the ordinary fluids applied to the eye: but for a bottle in which to properly sterilize fluids, and a convenient way of handling them, I know of none which carry out this method better than those introduced by Dr. Stroschein. The name of the contained solution is indelibly inscribed upon the face of each flask at the time of making the bottle. Various colors indicate the various solutions contained. Thus: the bottle for atropine is black; that for cocaine, white; for eserine, red; and for homatropine, blue.

No. 8 is a flask lately devised by Llewellyn, pharmacist of Philadelphia, and is very useful where accuracy is required in dropping. The heat of the hand causes one drop to follow another very slowly; in addition the rubber bulb may be compressed to cause a larger stream to flow when necessary. These flasks come in sets, also having names of various drugs such as are used in ophthalmic practice, blown in the bottle.

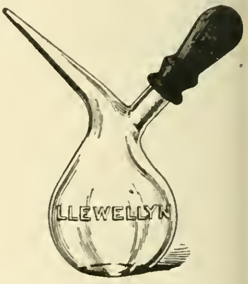

Fig. 8.

As these flasks are less complicated than the Stroschein bottle, I am at present experimenting with them in sterilizing the contained fluid used in cataract operations. With the Stroschein bottle it is necessary to reverse the pipette after the boiling of the fluid, and replace the rubber nipple. Unless this is done with sterilized fingers, one runs some risk in provoking just what he is trying to prevent—infecting the point of the pipette. In the Llewellyn flask it is obvious that all of these dangers are minimized. The boiling of the fluid is done precisely as with the Stroschein bottle.

1304 Walnut St.

# CAN PRESBYOPIA BE DEFERRED BY RHYTHMIC EXERCISE OF THE CILIARY MUSCLES?*

BY G. C. SAVAGE, M.D.,
NASHVILLE, TENN.

One of two conditions, or possibly the two combined, constitute the causation of old-sight: the one, loss of ciliary power: the other loss of elasticity of the crystalline lens. That either of these conditions existing alone could cause old-sight none can doubt; that the two conditions co-exist in well-advanced cases is a matter easily believed. Lost elasticity of the lens would lead to inactiviry and consequent atrophy of the ciliary muscle; while diminished or lost ciliary action would cause suspension, if not loss, of lens elasticity.

That the leading cause of old-sight is failure of ciliary power we think may be proven; and, if this is true, simple and scientific means for deferring the onset of presbyopia may be brought into use. Rhythmic exercise can be as readily effected in the ciliary muscle as in any of the extra-ocular muscles. Will this exercise develop the power of these muscles that are under the direct control of the *guiding sensation*—the common master of all the extra and intra-ocular muscles?

That involuntary muscular fibers can be increased in size and augmented in power, as a result of effort to overcome obstruction, is a matter of common acceptance, so far as the heart and bladder are concerned In mitral stenosis it is well known that the walls of the left auricle become hypertrophied and more powerful so that it may send the blood through the narrowed opening into the ventricle: in like manner when there is obstruction at the aortic opening, the walls of the ventricle become hypertrophied and more powerful.

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* Read in the Nashville Academy of Medicine January, 1894.

When the prostate gland is enlarged, or there is stricture of the urethra, impeding the flow of urine, the muscular fibers in the walls of the bladder are increased in size and become much more powerful, so as to be able to force the flow. It will be conceded that this muscle development in heart and bladder results from *effort* to over-come obstruction.

Displacement of images by prisms and blurred images by means of concave lenses are obstructions which, if not too great, will be overcome by muscular action, the former by action of the recti muscles, the latter by action of the ciliary muscle. Many observers have already acknowledged that rhythmic exercise of the recti muscles, by means of prisms, and of the obliques by means of cylinders properly placed, not only increase their power, but at the same time dispels the nervous phenomena associated with, and dependent on, their former weakness. If the ciliary muscles can be developed by rhythmic exercise, then concave lenses, not too strong, used rhythmically but not too long at a time, may be the means of deferring old-sight to five or ten, or even more, years beyond the now-common age of its onset—about the age of forto five years.

As in developing the recti and oblique, so in the development of the ciliary muscles, the power to over-come obstruction should never be taxed to anything like its fullest capacity. Gentle contraction and relaxation, rhythmic in order, continued five to ten minutes and repeated two or three times in the twenty-four hours, must result in giving tone to the ciliary muscle. The time of life for beginning the exercise, and the strength of concave lenses to use, are matters that must be settled by observation and experience. As a preliminary to the treatment of failing accommodation, all existing focal errors should be corrected, and this correction should be worn behind the exercise lenses at each sitting. It is my present judgement that – .50 D. spherical lenses properly centered will be the most useful. The patient should be seated fifteen to twenty feet from a lighted candle, lamp or gas-jet and should look at same through the concave lenses five seconds and then raise them for a period of five seconds, and so on till the end of the sitting. It is evident that, with the focal correction on when needed, the image of the flame is sharp, satisfying the guiding sensation, without ciliary action. The moment the weak concave lenses are lowered the image is blurred, and at once the ciliary muscle is called into action, to again return to a state of rest the moment they are raised. Thus contraction and relaxation are easily induced. In this way the nutrition of the muscle should be improved and its power enhanced, or maintained. The age at which to begin the exercise, as a rule, need not be under forty nor over forty-three years: and it should be continued as long as the proper reading distance is preserved.

The question would naturally arise in the mind of the patient as well as that of the practitioner "Can any injury come from the treatment?" The nutrition of the ciliary body is from the blood that circulates in it. Nothing is more reasonable than that gentle, rhythmic and periodic exercise of the ciliary muscle would improve the nutrition of the ciliary body, just as the nutrition of other muscles is improved by proper exercise. No harm then could come to the *muscle* as a result of the proposed gymnastic exercise. May we fear unfavorable change in the lens as a consequence of this exercise of the ciliary muscle? It is generally conceded that the lens gets its nourishment, by the process of osmosis, from the blood circulating in the ciliary body. It must be acknowledged that the better the nutrition of the lens the more likely will it retain its two very important properties, transparency and elasticity. It cannot be denied that the better the nutrition of the ciliary body the more healthy will be the crystalline lens. We must conclude that, if the exercise would improve the condition of the ciliary body, it would at the same time have a tendency to improve the nutrition of the lens, whereby the latter would be only the more certain to continue both transparent and elastic. Thus not only may old-sight be deferred, but also the development of cataract may be prevented.

May there not be such a condition as congenital weakness of the ciliary muscle? If so, have we not, in the proposed rhythmic exercise by means of concave spherical lenses, a source of power to the weak muscles?

Since reading the above paper before the Academy of Medicine, continued observation and experience have so far been comfirmatory of the correctness of the thoughts contained therein. As to the last paragraph of the paper I am sure that there is a great deal more in it than I thought there was at the time it was penned. Not only may there be a congenital or an acquired weakness of both ciliary muscles, but there are undisputed cases of greater weakness on the part of one muscle than on the part of the other in the same pair of eyes. For instance: one eye may have an accommodative power of 4 D. while the other, under similar tests, would show an accommodative power of 5 or more D.

When there is a similar want of power in the two muscles they both should be exercised at the same time after the method set forth in the paper. If there is a difference in the power of the two muscles the eye having the stronger muscle should be covered while the other muscle is exercised by means of the concave sphere.

If any case of hypermetropia associated with exophoria is more comfortable by wearing the convex glasses correcting same, that of itself is an evidence of either a congenital or an acquired weak condition of the ciliary muscles. These cases are sometimes, though rarely, met with. Such a case furnished with concave glasses to be worn continuously as is sometimes done, by opticians, would be made worse and not better; while if the ciliary muscle were stronger the concave glasses making the case more hypermetropic, but at the same time lessening the complicating exophoria, would bring relief to the patient.

# SECTION ON OPHTHALMOLOGY, A. M. A.

## SAN FRANCISCO MEETING.

ALBERT R. BAKER, M.D., Chairman, 122 Euclid Ave., Cleveland, O.
LEWIS H. TAYLOR, M.D., Secretary, 41 S. Franklin St., Wilkes-Barre, Pa.

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### PRELIMINARY PROGRAMME.

A Clinical Study of the Myopic Eye—Its Genesis and Treatment. Dr. S. D. Risley, Philadelphia, Pa.

Asthenopia. Dr. C. M. Hobby, Iowa City, Iowa.

The Physiological Basis of certain Oculo-Muscular Phenomena, incorrectly termed Anomalies· Dr. F. B Eaton, Portland, Oregon.

The Value of Retinoscopy as the Crucial test of the Correction of Refraction Errors. Dr. B. A. Randall, Philadelphia, Pa.

Toxic Amblyopia. Dr. James A. Lydston, Chicago, Ill.

Amblyopia. Dr. A. H. Voorhees, San Francisco, Cal.

Are low degree Lenses of purely Mythical Value? Dr. H. M. Starkey, Chicago, Ill.

Great Value of weak Lenses in the Correction of Eye Pains. Dr. Julian J. Chisholm, Baltimore, Md.

Sub-conjunctival Injections in the Treatment of Eye Diseases. Dr. Wm. E. Briggs, Sacramento, Cal.

Fractures of the Orbit. Dr. J. F. Fulton, St. Paul, Minn.

Cyclophoria—Its Detection and Treatment. Dr. George H. Price, Nashville, Tenn.

Status of Skiascopy. Dr. H. V. Würdeman, Milwaukee, Wis.

School Children's Eyes—A Plea for the Examination of every Child's Eyes when commencing to attend school. Dr. W. F. Southard, San Francisco, Cal.

Iritis and its Treatment. Dr Louis F. Love, Philadelphia, Pa.

Some Observations upon Gould's Method of Managing Exophoria. Dr. Leartus Conner, Detroit, Mich.

Conservative Treatment of Injuries of the Eye-ball, with cases. Dr. Lewis H. Taylor, Wilkes-Barre, Pa.

Report of the committee on "The Value of Objective Tests for the Determination of Ametropia." Dr. Edward Jackson, Chairman, Philadelphia, Pa.

Retinitis Pigmentosa. Dr. Dudley S. Reynolds, Louisville, Ky.

The Treatment of Purulent Ophthalmia. Dr. X. C. Scott, Cleveland, Ohio.

# THE OPHTHALMIC RECORD,

PUBLISHED MONTHLY.

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G. C. SAVAGE, M. D., Editor and Publisher,
621½ Church St,, Nashville, Tenn.

It affords pleasure, on the part of the Editor, to present in parallel columns the very similar views arrived at independently by Dr. Norton and himself, as to the necessity of taking into consideration the condition of the lateral recti muscles in prescribing glasses for hypermetropes. This publication concedes priority to Dr. Norton. The wonder is that his publication did not become more generally known. The chief value of his paper was in part, at least, concealed by its title.

In the Geo. S. Norton rule there is the error that latent hypermetropia is more common in esophoric than in exophoric case. The very reverse is true as has been shown in this Journal, in No. 11 Volume 2.

| Norton—1890. | Savage—1893. |
|---|---|
| The correction with glasses of what is understood as manifest hyperopia, in cases associated with exophoria, will, in many instances result in no permanent relief, but rather, untimately, in positive harm. | The ciliary strain necessary for the correction of 1 D. to 3 D. hypermetropia is more kindly borne by the nervous system, in many cases of exophoria, than would be the pseudo-exophoria which the correcting lenses would |

engender. Thus there is a reason for making no correction at all or only a partial correction of hypermetropia in certain exophoric cases.

* * * * *

Who has not seen one or many hypermetropes wearing comfortably concave lenses, who could not bear the use of convex lenses? Such cases have always been exophoric.

Those cases in which the necessity of glasses seems to be imperative, improper glasses may be prescribed from a lack of careful examinations as to the condition of the recti muscles.

* * * * *

Examine the muscular condition, both with and without the glasses, which correct the refractive error.

At first—probably from one to several hours—a mydriatic, in hypermetropic eyes, will increase the esophoria, will lessen an exophoria or convert it into orthophoria or even into an esophoria.

* * * * *

All tests for lateral heterophoria are wholly unreliable within the first few hours after eyes have been brought under the influence of a mydriatic.

I found that in many cases of hyperopia with esophoria, we could correct the esophoria by the use of convex glasses.

* * * * *

" In manifest hyperopia with esophoria give stronger glasses

Esophoria depending on hypermetropia solely is wholly relieved by advancing years, as well as by glasses that fully correct the focal error. It is also relieved, after the first few hours, by the use of a mydriatic and than in the same degree of manifest hyperopia with exophoria, for one can depend upon there being a higher degree of latent hyperopia in the former than in the latter."—[Geo. S. Norton's rule.]

*     *     *     *     *

If we have hyperopia with esophoria, my experience leads me to believe that the use of glasses is imperative, and I have found that in the majority of cases we can correct the esophoria by use of the convex glass, and it has been my custom to prescribe the glass which corrects, or nearly so, the esophoria; and this will usually be the glass that represents the manifest hyperopia, or a little stronger one, and should be used continuously. In some cases, in which the esophoria is of a high degree, the convex glass necessary to correct the esophoria will be too strong to be worn with comfort, when we should only approach as near as possible to a correction and yet give comfort and clear vision to the patient.

this relief continues with the continued use of the drug.

*     *     *     *     *

Augmented action of the centers of convergence excites a corresponding *tendency* to act on the part of the centers of accommodation, which, in most cases, is restrained by the guiding sensation; but in some cases the *tendency to action* of the accommodative centers when the interni are weak, becomes uncontrolable by the guiding sensation and real spasm of accommodation (pseudo-myopia) is developed.

### DEDUCTIONS—NORTON.

1. Always examine the muscular deviation with and without the correcting lenses, as convex glasses will increase exophoria and decrease esophoria.

2. If exophoria exists with hyperopia, always prescribe the weakest glass possible or none at all.

3. If esophoria is found with hyperopia, prescribe the glass that corrects the esophoria, or as nearly so as possible.

### DEDUCTIONS—SAVAGE.

1. Give a full correction of hypermetropia when associated with esophoria.

2. Give no correction or only a partial correction of hypermetropia when associated with exophoria.

3. Give a full correction of myopia when associated with exophoria, and when there is orthophoria.

4. Give only a partial correction, or none at all, of myopia when associated with esophoria.

5. A full correction of hypermetropia cures a pseudo-esophoria in esophoric cases, and creates a pseudo-exophoria in exophoric cases.

6. A full correction of myopia cures a pseudo-exophoria in exophoric eyes, and creates a pseudo-esophoria in esophoric eyes.

7. In hypermetropia associated with internal strabismus, fully correcting lenses, aided by mydriatics, remove all pseudo-esophoria and thus make it possible for the guiding sensation to resume control of the converging centers in such a way as to restrain the true esophoria, and thus cure the strabismus.

8. In myopia associated with exotropia, fully correcting lenses, with myotics, will remove pseudo-exophoria and thus make it possible for the guiding sensation to restrain the true exophoria and thereby cure an external squint.

9. Any test for lateral heterophoria within the first few hours after beginning a mydriatic is wholly unreliable, even with lenses on.

The above conclusions are based on the idea that nothing is to be done for the direct relief of the muscle errors. A better practice would be to cure the heterophoric conditions by rhythmic exercise, when possible, otherwise by operations (partial tenotomies and shortenings) and rhythmic exercise, and then give an approximately full correction of whatever focal error may be.

## GO TO SAN FRANCISCO

And enjoy the fruits of the labors of those whose names occur on the programme of the Section of Ophthalmology as published on another page. Have you promised a paper? If not, is not some ophthalmic question weighing on your mind, on which you could write for the edification of others, who in turn may edify you? Decide to write and send title of paper at once to either Chairman Baker or Secretary Taylor.

The programme for the Section of Otology and Laryngology came too late to get regularly into this issue, but it is so full and good we publish it in the form of a supplement, for the benefit of our readers. Chairman Ingals and Secretary Fulton have been active, as evidenced by the long list.

## THE REFRACTIONIST

Is a new Ophthalmic journal, volume 1 No. 1 of which is before us. The Editor is Dr. Francis F. Whittier, of Boston. As its name indicates, the chief object of its existence is that it may be an exponent of the laws governing refraction and the rules by means of which these laws may be applied. We presume, however, that no communication on any ophthalmic subject will be rejected if offered, provided there is merit in it. There is no need of saying that there is no room for it—any meritorious publication can make room for itself. Dr. Whittier has doubtless counted the cost, in labor and money, of the glory he is to win as an Editor, and has entered the field for conquest. We wish him and his journal well. The subscription price of the Refractionist (16 pages) is $2.00, published monthly.

## MISSING NUMBERS.

Have you lost any of the numbers of volume 3, which closes with the next issue? If so it will be our pleasure to replace them gratis, so that your copy of the volume may be complete. That you may know, please look into the matter at once. We can replace lost numbers only for a short while.

THE

OPHTHALMIC RECORD.

VOL. III. JUNE, 1894. No. 12.

# RETINITIS ALBUMINURI.*

BY L. WESTER FOX, M.D.,
Professor of Diseases of the Eye, Medico-Chirurgical College,
PHILADELPHIA, PA.

The relationship of diseases of the eye to general diseases was established long before the introduction of the use of the ophthalmoscope, but by the introduction of this valuable instrument certain diseases which were only mooted, have long since been made a certainty. It is very interesting to read, in the light of our present knowledge of intra-ocular diseases, what the first Mackenzie said about this instrument. When the ophthalmoscope was first shown him and he made an examination of the eyes of several patients he said:—"The ophthalmoscope of Helmholtz, Coccius and Follin, are likely to assist in the detection of the effects of inflammation, both in the crystalline and in the vitreous body."

A fact well known to the general practitioner is that the outside of the eye presents certain symptoms as characteristic to him, as the characteristic fan shaped white spots of the retina are to the ophthalmologist.

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* Read before the Alumni Meeting of the College, Feby. 16, 1894.

Oedema of the lower-eye lid is a very characteristic symptom of Bright's disease; the subcutaneous tissue being much relaxed affords a favorable ground for the development of oedema. The upper eye-lid does not present this puffiness so frequently, on account of the histological formation of the lid. Associated with this puffiness of the eye-lids, we find the muscle of accommodation also giving way, and, in reading, dimness of vision, a rapid recovery of the word, then again fading; at times want of converging power as if a row of double sentences appeared, one word over the other. This condition shows more with hyperopes, suffering with Bright's disease, than myopes. As regards the pupils, they are dilated, owing to want of controlling power of the sphincter of the iris. As regards a change in the iris itself, Leber has recognized a number of cases. In fact this writer lays so much stress on this condition that, in all doubtful cases of inflammation of the iris, he suggests that the urine be examined for albumin. Ewetsky has seen posterior synechia in iritis, in patients with albuminuria. Whether an albuminuria *causes* cataract there is still some doubt, but one is struck with the frequent coincidence of albuminuria in cataract patients. In order to explain this fact in cases of senile cataract, Michel says that it is essential to consider that cataract and albuminuria are the results of alterations produced simultaneously in the eyes and in the kidneys, from the same general cause, arteriosclerosis. This theory recalls, to a certain point, that of Sutton, who considered that interstitial nephritis and hypertrophy of the left ventricle are both caused by an alteration of the vascular walls (arterio-fibrosis.) Berger, Becker, and the greater number of those who have made a special study of this question do not believe in the relation claimed by Deutschmann between cataract and nephritis. Ewetsky, who examined 200 patients with cataract, only found 19 per cent. of these individuals afflicted with albuminuria; on the other hand he examined the eyes of 97 nephritics, of which 70 had not attained the age of 50 years, and only met with cataract in 8 per cent. of these patients, and in this number there was but one who was less than fifty. From these facts this author concludes that cataract does not show itself in young persons attacked by nephritis, and it is no more frequent in nephritics before they attain the age of 50, than in those whose kidneys are normal.

The most important tunic of the eye, which reflects the condition of the general economy, is the retina. From observations which I have made, but have not been quite able to confirm, I feel that in certain forms of retinal hemorrhage, especially of the striated variety, we have the forerunner of non-albuminuric Bright's disease. The blood vessels show a sclerosis of their coats, that is, the external coats are whitened in such conditions. We find that the capillaries also are involved in a similar manner, or, in other words, there is an arterio-capillary fibroid change, which has been described by Gull and Sutton. With patients suffering from what Dr. Mohomed would call the first, or functional stage of Bright's disease, we observe with the ophthalmoscope, a fulness of the arteries and a slight pulsation of the central artery, not unlike that which is observed in glaucoma. This is pathognomonic of high arterial tension, and when this condition exists for a longer or shorter period we have the retinal hemorrhages as described above, and yet, if the urine be examined, we find that it is absolutely free from albumin. I believe that this sclerosis may be recognized earlier than in the condition described in a very able and exhaustive article on non-albuminuric Bright's disease, by Dr. D. D. Stewart, in the American Journal of the Medical Sciences for December, 1893.

Retinitis observed in nephritis is of very great importance; it is met with in six or seven per cent. of cases of inflammation of the kidneys. It is most frequently found in interstitial nephritis, in infectious nephritis (scarlatina), in the albuminuria of pregnancy, complicated or not by eclampsy. Albuminuric retinitis is not often seen in parenchymatous nephritis or amyloid degeneration of the kidneys. (Berger).

Heymann was the first to call attention to the retinal changes, which he regarded as characteristic in interstitial nephritis. Every ophthalmologist can readily call to mind cases in which the ophthalmoscope first revealed the existence of albuminuric retinitis, the diagnosis being subsequently confirmed by a urinary analysis. Within the last week a patient presented himself at the Eye Clinic for relief of failing vision. As is usually the case with these patients, she had first consulted the itinerant spectacle vendor for glasses, and, finding no betterment of her vision, she applied to us for relief. The ophthalmoscope revealed an extensive retinitis with extensive retinal hemorrhage. Examination of the urine showed about 40 percent. albumin by quantity. This woman, according to her history, did not complain of untoward symptoms of any kind, merely a failing of her vision.

The chief signs of albuminuric retinitis are the following:—The optic nerve seems swollen and fluffy, is of a reddish color and hazy, the vascular walls surrounding the blood columns, form white lines more or less pronounced; these constitute the retinal white spots which were formerly regarded as the product of a fatty degeneration. The yellow spot gives star or fan-shaped alterations which at first were considered as characteristic of albuminuric retinitis, but they are now known to exist in other kidney diseases. These star-like changes consist of brilliant white spots which radiate around the macula, the spots are edged by brownish pigment and here and there show small retinal hemorrhages, desseminated through the spots or beyond in the otherwise normal retina.

It is a singular fact that in the more advanced stage the white spots, excepting those of the macula, disappear little by little;

the edge of the optic nerve, indistinct in the beginning of the disease, again becomes apparent. Hyperæmia of the papilla disappears, the vessels, chiefly the veins are at this stage very tortuous, the thickening of the walls of the blood vessels much more pronounced than at first, and the white spots become more apparent. In certain cases of albuminuric retinitis, the star-shaped lesions are absent from the macula, while in the retina are seen curiously shaped spots of extensive area. According to Berger, one meets with (optic neuritis) papillitis, with and without the star shaped spots.

Magnus first described a special form of albuminuric retinitis, in which the inflammatory symptoms are but little marked or entirely absent.

Authorities differ as to the prognosis, in retinal hemorrhages associated with Bright's disease. Hirschberg gives a case where his patient died three and a half years after the retinal hemorrhages. We must not forget that, in albuminuric retinitis, hemorrhages may coincide with an acute inflammation of the retina. My own experience has been, where retinal hemorrhages and the colloid degenerations are coincident, that death is close at hand. The more extensive the hemorrhages, the shorter the expectation of life. The typical deposit, as seen with the ophthalmoscope, may also give us a guide as to the fatality of the disease. I may mention here that the left eye is more frequently attacked than the right. According to Liebreich, albuminuric retinitis may be complicated by diffused choroiditis, and cases are known of albuminuria with change in the choroid only, the retina undergoing no change at all. There are other cases where the little flecks in the vitreous body were the first intimation of choroidal lesion. These cases must be exceedingly rare, as, in an extensive search I have not yet been able to locate a single one. In detachment of the retina due to albuminuric choroiditis, no apparent visual change takes place, although Anderson thought he observed it in a little girl of nine years of age. This child, after measles, was attacked by nephritis, which caused this chorio-retinitis albuminurica. This bi-lateral detachment of the retina caused blindness. Ewetsky holds that this detachment of the retina may be observed in albuminuria, without there being albuminuric retinitis. The same author proved that the condition known as scintillating synchysis, floating opacities in the anterior part of the vitreous is due to the same relative condition. The visual acuity is lessened in proportion to the pathological change which has taken place in the retina. If the lesion has extended around the macula, and the fovea centralis escapes, normal vision may exist, but if the surrounding field is infiltrated this good vision soon falls off to one-third, or may even end in blindness for *direct* vision, peripheral vision remaining. The clouded vision may be so marked that only movements of the hands can be seen. Even if the morbid process of the kidneys is modified, the prognosis of vision is very unfavorable, as secondary glaucoma may follow.

Cause.—As to the cause of albuminuric retinitis, Franke attributes it to the increased arterial tension of interstitial nephritis, but according to Cohnheim and Albutt, this disease exists without hypertrophy of the left ventricle and without increase of vascular pressure. Förster thinks that the disease is produced by alterations of the blood which cause degeneration of the blood vessel walls. Charles Theodore, Duke of Bavaria, who made a special study of this disease of the eye, found hyaline degeneration and endarteritis in the vessels of the retina; at certain places the small vessels were dilated, resembling aneurisms. The hyaline degeneration attacked the internal and middle coats of the arteries, which caused considerable diminution of their calibre. The veins, on the contrary, are dilated; at times he found small, fatty granulations filling the cavities of the small arteries. Microscopic examination shows that small hemorrhages existing in the retina may break through this coat and extend into the vitreous body. The limiting internal membrane of the retina is generally thickened. The layers of the nerve fibres are distended and varicose, an interstitial œdema separates, more or less, one layer from the other; on the other hand the layer of the rods and cones is almost normal.

In a more advanced stage of albuminuric retinitis, a new formation of vessels and capillaries may be seen in the retina. Cavities hollow out between the fibres of Müller, and these are filled by a homogenous, albuminoid liquid, or by clots of fibrin. The fibres of Müller themselves are thickened and seem sclerosed. Later they show traces of fatty degeneration and are full of granulations or of small drops of fat. The detachment of the retina which complicates some cases of albuminuric retinitis is probably due to transudation through the walls of the vessels.

The same vascular lesions, which in the retina bring such serious consequences, provoke almost no nutritive trouble in other parts of the eye. This difference is doubtless due to the retinal arteries being the terminal arteries, while those of the iris and choroid assure the circulation of the blood, even when partial occlusions exist in these vessels. Usually the prognosis of albuminuric retinitis is grave enough and the life of the patient is seriously threatened. Nevertheless, there are exceptions:—In pregnant women there are many cases of complete cure, the sight becoming normal and the general health re-established. It may be, moreover, that, in spite of a greatly improved condition, the albuminuric retinitis of pregnancy does not disappear, the optic nerve is atrophied and some of the retinal vessels are transformed into fibrous fasciæ. (Berger.) The patient survives, but the visual acuity is diminished, and, when pregnancy occurs again, albuminuria reappears at the same time with the disease of the retina and the patient dies (Fuerst). Following scarlatina, the cure of renal and retinal lesions has often been seen. In a certain number of cases of albuminuric retinitis, due to interstitial weakness, the sight is more or less weakened and finally convulsions and amaurosis ensue. The greater number of patients attacked by albuminuric retinitis succumb to kidney disease or its complications (cerebral hemorrhage or pulmonary œdema).

Miley, in order to emphasize the gravity of the prognosis, examined 164 patients attacked by kidney disease (nephritis), and the back of the eye was normal in 105 of these patients; in eight others were lesions noticeable by the ophthalmoscope, but without connection with the kidney disease; 51 presented symptoms of albuminuric retinitis. In the two following years, of the 105 cases which had no eye complications, 28 died; of the 51 attacked by albuminuric retinitis, 27 died. Consequently mortality is twice as great in those attacked by nephritis without ocular complications. The majority of the patients lived but twelve months after the day when the retinal disease was diagnosed; one alone lived 18 months. (Berger).

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I am indebted to Prof. Anders, Drs. Stewart, Daland and Bordman Reed and to Berger's magnificent work "On the Relation of the Eyes to General Disease," for information and statistics in the above paper. F.

# ASTIGMATISM.

## I. CAUSE AND STATISTICS.

By C. M. HOBBY, M.D., Iowa City, Iowa.

In approaching the consideration of the causes of astigmatism we are met at the outset by a remarkable insufficiency of detail concerning the embryological and comparitive anatomy of the eye. It has been the general impression that astigmatism was usually congenital, but if we search for data upon which this opinion is founded, the little that rewards the effort is very unsatisfactory. The tendency to look at the eye purely as an optical instrument is very natural; we should all be glad to have as much exact science as possible in the study and practice of medicine, but the effort at too great rigidity of laws and rules, in so complex a piece of mechanism as a vital organism,. is prone to warp the practical application of our knowledge away from the best results. And so, in considering the causes of astigmatism, we must recognize the plastic nature of the structures of the globe, that at the time of birth, a weight of a few grains will change the shape of the cornea, and that the lens is so nearly in a fluid condition as to change its shape, by its own weight, if allowed the opportunity. We have reason to believe that the retinal image, in nearly if not all of the mammalia, is less perfectly formed than in man; a dog will scarcely recognize his master by sight at fifteen feet, and the mare will not recognize her own foal by sight many feet, while she will tell the foot-falls of her stable companions rods away. Birds are credited with great acuteness of distant vision, but the wary wild-goose is deceived, by decoys and disguises, at distance that would render them unavailing to deceive the average human eye. We may I think accept the acute vision of birds of prey, and we have sufficient evidence that the nomadic tribes of man, possess greater acuteness of vision than is common amongst the more civilized races. We find the vision of those immediately decended from the pioneers of the country to be much more acute, on the average, than that possessed by their cousins in town. Those of us practicing in the western states, see less myopia in proportion to the number of cases of refractive error than those in the large eastern cities, just as the proportion in New York is less than in Berlin.

It is doubtful if primitive man derived much advantage from superiority of vision. It seems more probable that this was a later acquisition, the result of human competition and conflict, and, though shared by the female, predominated in the male; and it appears even amongst the civilized races that the male possesses a superiority in visual acuteness just as the female is superior in color sense.

The location of the point of fixation, which determines the angle alpha is of importance in the production of astigmatism of small amount, and in determining the axis; but how the point of fixation is produced, and whether it is developed, and determined before birth, are questions that must receive more attention from the embryologist, before we can consider this as a prenatal cause. We are left then in regard to congenital causes of astigmatism, to the influence of reversion, and to the occurrence of malformations, as the only explanations, so far advanced, with probability in their favor.

In childhood, if we leave out the consideration of the fixing point as evolved by the experience and practice of the individual, we find numerous causes for the production of astigmatism. Recalling the anatomical condition, we cannot help believing that causes which operate elsewhere to determine the shape of the head, that influence the development of the features, and mould and modify throughout the body, are competent to change the curvature of the cornea. And first amongst these causes is pressure. Pressure of the lids is capable of modifying, temporarily, the corneal curvature well along in life; in infancy the pressure of the lids meets the globe in a plastic form and if continued, such pressure must produce permanent modification of shape. If we examine numerous individuals we will find considerable diversity in the development and distribution of the bundles of muscular fibres constituting the orbicularis muscle. The part of the globe receiving the maximum pressure depends in part upon the amount, with the adult usually the beginning of such pressure is upon the inferior internal quadrant, a slight increase brings in the superior internal quadrant, and pressure may be made on the upper half greater than the lower, or the reverse; causes for such continuous pressure as to be competent to produce astigmatism are sufficiently common, and frequent. The irritation of conjunctivitis, the intolerance of light in the phlyctenular inflammations, the irritable eyes following the exanthemata, are all in evidence as thoroughly competent, and further, it is rare to find cases that have suffered from phlyctenular keratitis, without astigmatism. This has been often noticed, and the causative relation reversed.

For the asthenopia of children measles is often assigned as the cause, by parents, and in such cases astigmatism is the rule. In hyperopes the contractions of the palpebral fissure involuntarily made, to sharpen the image, lend themselves to the perpetuation of increased vertical curvature of the cornea, and so occasionally the same result proceeds from the habit of pressing with the finger upon the globe, covered by the lid, for a similar purpose.

It may be questioned whether undue prominence has not been given to lenticular astigmatism. It is apparent from the results of investigation with the ophthalmometer, that in a conservative way the lens becomes changed in curvature to lessen the effect of corneal astigmatism, and that it seldom happens that th total astigmatism is greater than the corneal, or that lenticula astigmatism exists when the cornea is free from it. Interestin cases of lenticular astigmatism have been reported, but they ar so rare that the suggestion of pathological cause may be raise in regard to them. The writer has observed one case in whic the lens, had much greater refractive power in the upper hemisphere than in the lower, very much as though a fluid lens ha become solid in the position determined by gravity in the vertical position. Cases of displacement of the lens, requiring detatchment from the zonula, must be considered as pathological and the excentric and non-parallel positions of the lens congenitally, are to a great extent remedied by the conservativ re-modeling heretofore referred to. In the few cases observe where the total astigmatism seemed to be 0.25 or 0.50 D. mor than indicated by the ophthalmometer, it may be that more complete mydriasis would have removed the apparent discrepancy.

In the table attached the results of careful measurements o 500 consecutive cases of astigmatism are given. The cases extend over about nine years of work, and are principally fron among students and professional people; all were private cases and no case was recorded without sufficient time was given fo careful investigation. The results as given by the ophthalmoscope, were compared in every instance; usually a mydriati was employed, always in myopic cases; and the mydriati employed was usually homatropia, although in cases of doub atropia, was subsequently used to clear up possible insufficienc of action in the milder mydriatic. Retinoscopy has been o great assistance in the very young, and the ophthalmometer since acquiring experience in interpreting its results, has prove of the greatest value in facilitating accurate determination o astigmatism. All tests of vision have been repeated witl changed cards, in order to eliminate errors on the part of the patient. At least 70% of the measurements have been made at an actual 20 feet distance, and a single letter missed has counted as complete failure for the whole line. It is believed that the care taken to eliminate the errors, resulting from the patient's remembering test letters, and acquiring familiarity with the card, is well compensated for in the result obtained.

The 500 cases presented 876 eyes with astigmatism, which would indicate that 75% were astigmatic in both eyes, this differs slightly from Burnett's statistics, * his cases showing but 69%, astigmatic in both eyes (his book says 41% unilateral, but this is an evident misprint for 31%).

Of the 500, 315 were females, being 63% as compared with Burnett's 58%. Doctor Burnett attributes the preponderance of females in his statistics to the fact that his clientele is drawn largely from the clerical force at the capitol, where the work is of such a nature as to cause small errors in refraction to be felt, especially by women. I cannot explain the much larger proportion of females in my cases in this manner. Amongst the students and professional people from whom I draw my patronage, the male sex predominates. In over 1300 cases of refractive error, there have been 58% females.

Astigmatism in my records is considered as a positive quantity always, although in the correction by glasses negative cylinders are employed when they possess any advantage; this method of recording cases clears up at a glance, the axial relations of the astigmatism and facilitates simplicity of prescription.

Considered in the usual way the 876 astigmatic eyes presented the following proportions.

| | | |
|---|---|---|
| Simple hyperopic astigmatism ....... | 306 | or 35%. |
| Compound hyperopic astigmatism . .. | 234 | or 27 |

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* A Treatise on Astigmatism. Swan M. Burnett, M.D., St. Louis, Mo., 1887.

| | | |
|---|---|---|
| Simple myopic astigmatism | 151 or | 17 |
| Compound myopic astigmatism | 138 or | 16 |
| Mixed astigmatism | 47 or | 5 |

In comparing this with the proportions of Doctor Burnett, the preponderance of hyperopic cases, exceeding 60% is marked, and I believe solely attributible to inheritance; if the cases of American parentage were taken by themselves, the proportion of hyperopes would be much greater, probably reaching 80%.

The meridian of greatest refraction as observed in the same cases, considering astigmatism always positive, was as follows:

Meridian ..... 90° 499 eyes = 57% "with the rule."
Meridian......180° 83 eyes = 8 "against the rule."
M. symmetrically oblique 92 eyes = 10%.
M. parallel .... .............20 eyes = 2
M. irregularly oblique... 192 eyes = 20

The proportion of symmetrically oblique cases would be greatly increased, if those differing but 5° were added to the list. The acuteness of vision, finally obtained is given for the different amounts of refractive error.

I. Simple and compound astigmatism less than 1.00 D. 287 eyes.

S. = $\frac{20}{20}$ or better...... ... ... 221 eyes.
S. = $\frac{20}{30}$ " ............... 56 "
S. = $\frac{20}{40}$ " ....... ...... 7 "
S. = $\frac{20}{50}$ " ....... ...... 1 "
S. = $\frac{20}{60}$ " ...... . ...... 2 "

II. Simple and compound astigmatism 1.00 D. to 2.50 D. 319 eyes.

S. = $\frac{20}{20}$ or better..... ....... 207 eyes.
S. = $\frac{20}{30}$ " ...... ....... 62 "
S. = $\frac{20}{40}$ " ............... 20 "
S. = $\frac{20}{50}$ " ........ ...... 11 "
S. = $\frac{20}{60}$ or worse............... 9 "

III. Simple and compound astigmatism 2.75 D. and greater, 270 eyes.

S. = $\frac{20}{20}$ or better ................ 76 eyes.
S. = $\frac{20}{30}$ " ................ 63 "
S. = $\frac{20}{40}$ " ................ 41 "
S. = $\frac{20}{50}$ " ................ 37 "
S. = $\frac{20}{60}$ or worse ...... ...... 63 "

This shows that of the first class 77% got $\frac{20}{20}$ or better, and 99% got $\frac{20}{30}$ or better; of the second class 65% got $\frac{20}{20}$ and 87% got $\frac{20}{30}$ or better; while of the third class only 20% got $\frac{20}{20}$ or better and only 51% got $\frac{20}{30}$ or better. Taken together 57% got $\frac{20}{20}$ or better.

In Doctor Burnett's cases $\frac{20}{20}$ was obtained in only 36% of the total. As my cases do not present a larger proportion of low degrees of error than his, the greater percentage of acute vision obtained is probably due to the preponderance of hyperopic cases.

# THE TREATMENT OF PTERYGIA WITH THE GALVANO-CAUTERY.

By ARTHUR G. HOBBS, M.D., Atlanta, Ga.

I shall not presume that it is necessary in describing this method of operating on pterygia to even enumerate the many already in vogue. I should rather ask your forbearance for merely suggesting to you that yet another method is to be added to the list already, perhaps, too long; still it may be true that each of these operations have served its purpose in turn, in the process of evolution. Since it is the cardinal point in making a pterygium operation to prevent two raw surfaces from remaining in apposition after the operation, which necessarily results in the relapses which we too frequently see, why not then convert each of the raw surfaces into an eschar at once to avoid such failures, provided we are able to demonstrate practically that this means will bring about that desired result?

For some years the galvano cautery point has been resorted to in corneal ulcers, particularly in those indolent and intractable ulcers which have refused to yield to other methods of treatment. It was suggested to me a few years ago, after seeing some of the beautiful results of the cautery when applied to ulcers of the cornea that it could, at least, produce no bad results, if properly applied to the neck of a pterygium for the purpose of cutting off the nutrition of its corneal apex. I hoped that it would prove a better means of severing the arterial supply to the apex as it crossed the sclero-corneal junction. This object is generally attained by the use of the knife, and various methods have been resorted to, to accomplish the purpose. The failures in pterygium operations are usually due to the resulting re-establishment of the arterial circulation and when this occurs the desired end of the operation fails in proportion to the number of the re-established vessels. The great vascularity of a pterygium, with its vessels crossing over the sclero-corneal line to supply its apex on the cornea renders it difficult to permanently sever all the arteries by a clean cut with the knife, hence perhaps a score of different methods of knife and scissors operations have been resorted to by different operators to accomplish this end.

Each operator aims at one end primarily, and that is to completely cut off all the blood supply from the corneal apex. Secondarily, his desire is to destroy as little conjunctiva as possible. When the first end is attained the corneal part of the pterygium has lost its direct nutrition and can then only share with the cornea proper for its sustinance, which is indirect, or by imbibition. As this meagre supply proves insufficient and the partial, or almost complete, obliteration after a time will depend upon the activity of the absorbents. For this reason the best results are obtained in younger subjects in which as a rule, the lymphatics are more active, as is also the contractibility of the arterial coats.

In many cases when the knife is resorted to a secondary pterygium results in which sufficient nutrition is re-established to the apex to perpetuate the corneal haziness even beyond its apparent margin to greatly interfere with vision. When the cautery section is well made I have not seen these secondary results that are often so difficult to prevent by a clean cut with the knife or scissors. In some cases, however, it may be best to combine the methods of operating, as I have done in two cases not included in this report. These two pterygia were extremely vascular and muscular hence I first used the knife in the usual way and then seared the divided edges with the cautery blade to prevent the secondary results.

The fine pointed cautery blade, heated with a battery that can be perfectly gauged and always relied on, is applied horizontally to the narrowest portion of the growth which is near the sclerocorneal line; the touch is made at the moment white heat is reached and should be almost instantaneous, and reapplied as quickly if the tissues are not at first completely severed. If the growth is not adherent to the sclera and corneal margin it is best to grasp it with small forceps and slightly raise it from the sclera. When the forceps are used it is easier to be certain that the cautery has made a complete section of all the hypertrophied and over-vascular conjunctival tissue.

Where the corneal head is large and protruding it is advisable to make a cautery application in the same manner as in applying it to a corneal ulcer. In both cases the resulting cicatrix is less—it is more transparent. This is not altogether an unknown fact, but one that has seemed never to have been brought out as prominently as its importance would suggest. For this reason one may be tempted often to resort to the cautery to reduce a large pterygium apex or a corneal ulcer, for the purpose alone of attaining this corneal transparency. The resulting eschar so completely severs the vascular connection leaving no raw surfaces in apposition that a re-established circulation is practically impossible; this can not be said when the knife or scissors have been used. In case the redundancy of tissue at the point of section should seem to require reduction, the scleral end of the section may be turned under and a transverse suture introduced.

I have made this operation fourteen times, and would have made it half as many more times during the last two years, but for that decided objection to the cautery which we so often meet with and are bound to respect. This operation is more quickly performed; it is followed by no bleeding; it leaves no ecchymosis; the wound heals more rapidly; there is less pain during and after its performance; it requires no bandages and the corneal haziness around the apex is less.

A weak solution of cocaine, about a two per cent., is first dropped into the conjunctival sac, then after about five minutes a stronger solution, about a ten per cent., is applied at intervals, locally, by means of a small cotton probe, for five minutes more, in the mean time the lids are held open. By this means the toxic effects are avoided except in those subjects that are unusually susceptible to cocaine. In using cocaine, in this latter strength, I try to avoid as much as possible, by the position of the patient, its contact with the cornea. It is now a well known fact that when used in this strength, or even when much weaker, that this drug is disastrous to an abraded cornea if long continued.

The kind of galvano-cautery apparatus, the ease of its manipulation, the size of the blade, the confidence of the hand that presses the button, the requisit degree of heat, which should be gauged by the turn of the screw, are some of the necessary factors in this seemingly simple, yet delicate, little operation, whether it be made to a corneal ulcer or to the neck of a pterigium. The only galvano-cautery apparatus in my knowlrdge that I would now be willing to trust for these purposes is the "Transformer" of the alternating current of 52 volts.

I am now using, in my consultation rooms, the first two of these little instruments made.

I described the varied uses and advantages of this "Transformer" in a paper read before the Pan-American Congress last fall. So far as I know, the galvano-cautery has not hitherto been used as a means of cutting off the nutrition of the corneal apex of a pterygium.

# THE USE OF THE ELECTRO-MAGNET IN REMOVING FOREIGN BODIES FROM THE EYE.*

By ALBERT RUFUS BAKER, M.D.,

CLEVELAND.

While a student in Berlin, in 1882, I first saw Dr. Hirschberg make use of the electro-magnet for the removal of foreign bodies from the eye-ball. The magnet he used at that time would only lift about twelve or fifteen ounces.

Immediately upon my return home, in the Fall of 1883, I had constructed this magnet, which I have the pleasure of showing you to-day. It will readily lift five or six pounds, and is but slightly heavier or more cumbersome than Prof. Hirschberg's magnet.

Owing to the inconvenience of transporting a fluid batter, Mr. Shackleton, my student, has constructed this dry-cell battery, which has been in use about four months, and so far as I can see, is just as strong as ever. The principal objection to dry-cell battery is, that it will finally become exhausted, and the cells will have to be replaced by new ones. But I have no doubt they will last three or four years with the use an oculist requires of them; and as they only cost from fifty to seventy-five cents for each cell, the expense is not as great as that of rechanging an ordinary fluid battery. Six cells are used; they are hermetically sealed, and can be upset, or carried upside down, without any fear of damage.

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* Read before the Ohio State Medical Society, June, 1893.

During the past ten years I have probably made use of the magnet in one way and another in a hundred cases, and yet it is doubtful if its use has been of permanent value to patients in more than ten per cent, but it has been of use as a means of diagnosis in a number of cases.

In a few cases the results of its use have been brilliant, but these occur at such long intervals that the practitioner is often inclined to become discouraged in its use. One of the first patients in which I used it successfully was a child with a small chip of steel in the anterior chamber. The foreign body was removed so quickly and easily that is was with considerable pleasure that I undertook to remove, some months later, a small piece of the head of a nail from the viteeous humor of the eye of a young man, a carpenter, from Meadville, Pa. The piece of iron was very small, not much larger than a pin head, but could be seen with the ophthalmoscope as a bright, beautiful spot, almost in the center of the vitreous. I made an opening in the sclerotic, opposite the foreign body, and upon entering the point of the magnet could hear the peculiar click indicating that it had come in contact with the piece of iron. Upon withdrawing the magnet it failed to follow. Notwithstanding repeated introductions of the magnet, I failed to secure it, and finally enucleated the eye. When I opened the eye-ball, and laid it upon the table, and appled the magnet, the iron would be drawn to the magnet, and pull out the vitreous perhaps an inch, like a piece of rubber; in fact, I could lift the entire eye-ball off the table with the magnet In the light of my present experience, I think this eye was needlessly sacrificed, as I do not think that a piece of iron so thoroughly encapsulated could have done much harm if permitted to remain in the eye. I must confess, that this experience somewhat lessened my ardor in the use of the magnet, although I have had several cases since in which it has proved of great service. One case I recall, a Mr. Smith, from Conneaut, referred to me by the late Dr. Weed, who was struck in the eye by a scale which made a clean cut on the inside of the eye-ball, which the Doctor supposed to be conjunctival only; he put in a stitch, and when I saw the case afterward, the anterior chamber was filled with blood. Upon bringing the magnet near the eye-ball it would follow it, and the patient would complain of pain. I knew at once that there was a foreign body in the eye; removed the stitch, and upon applying the magnet to the wound, withdrew a scale of steel as large as the nail on my little finger, and about the same shape. The eye made a rapid recovery, retained its natural size and appearance, but no useful vision. Another somewhat similar case was that of a young boy who, with some companions in the country, was playing "Warriors Bold—Knights of Old," with a couple of old axes, which they were slashing together, when a large three-cornered piece penetrated the eye of one of the boys. It was easily removed from the vitreous chamber with the electro-magnet, but it became necessary some time later to remove the eye for fear of sympathetic inflammation of the good eye.

This is the usual course these cases of foreign bodies in the vitreous pursue. There is so much injury done by the penetrating wound, that the eye is necessarily destroyed, even though the foreign body is removed, or, escaping this, a sympathetic inflammation is excited.

Recently, a somewhat more favorable case came under my observation. A young man, working in one of our large manufacturing establishments, was struck in the cornea with a small piece of steel, which was rather deeply embedded in the substance of the cornea. The physician, attempting to remove it, pushed it into the anterior chamber. The case was then referred to me. The piece could be seen distinctly at the lower part of the anterior chamber. Upon placing the magnet at the point of entrance, the piece of steel would jump up to it. Upon removing the magnet, it would drop to its former position. The wound was slightly enlarged, and it was easily removed with the magnet.

The electro-magnet has, in a number of instances, proved of great value to me in making a diagnosis.

In cases in which there is a piece of iron or steel in the eye, when the strong magnet is brought in contact with the eye-ball, and carefully moved in one direction or another, the ball will move with it, and the patient will complain of pain in the eye when the magnet is brought near it. Much care will have to be exercised or the surgeon will be misled by the patient's statements.

Prof. Stilling, I believe, has suggested that an immense magnet connected with a large dynamo might be used, so that when applied to the surface of the eye-ball it would draw the steel through the tissues of the eye. If such a strong magnet should prove successful the expense would be too great for any one surgeon, but in a large city, where several oculists are engaged in practice, some hospital ought to be induced to put in such a magnet, and all the oculists, as well as other physicians, would be only too glad to send all their patients to an institution supplied with such an apparatus.

My experience would lead me to conclude that the electro-magnet has a limited field of usefulness in the removal of foreign bodies from the vitreous; that it is of much greater use in removing substances from the anterior chamber, iris and lens, and that it is of considerable value as an aid to diagnosis.

# A NOVEL METHOD OF CORRECTING ASTIGMATISM

By S. MITCHELL, M.D., Hornellsville, N. Y.,
Oculist and Aurist to St. James Mercy Hospital, Consulting Surgeon to the Hornell Sanitarium.

Several years ago I was consulted by Mr. B, a nimrod of this city. He had just returned from the chase, and the same afternoon while "beating the bush" for game, he had the misfortune to wound his right eye. The cornea was punctured by a small twig, near the sclero-corneal margin in the upper nasal quadrant.

When he reached my office the anterior chamber was empty, and a small hernia of iris was protruding from the wound. It being impossible to replace this protruding portion it was excised. The eye healed nicely, and during one of the subsequent visits to my office Mr. B, remarked that his sight had always been rather poor, and he was desirous of having glasses fitted; and so after the injured eye was entirely well I examined the eyes with this end in view. His vision was as follows:

V. O. D. = $\frac{18}{200}$ with + 2.25 $\bigcirc$ — 4.50 cyl. axis 120° = $\frac{18}{16}$.
V. O. S. = $\frac{18}{30}$ with + .50 $\bigcirc$ — .2 cyl. axis 60° = $\frac{18}{15}$.

Owing to numerous irregularities in the surface of the cornea, I could get no satisfactory results from retinoscopy in the right eye; but in the left the result was M = 1.25 D. in the meridian of 150° and H. = 1.25 D. in the meridian at right angle to this viz, 60°.

I did not possess an ophthalmometer at the time the first examination was made, but at a more recent one the following record was made with this instrument, and added to my notes: O. D. 8. D. axis 30°. O. S. 3. D axis 120°. There was esophoria of 3° for distance, and as my patients sporting proclivities were in no way diminished by the accident spoken of above, and he being satisfied that his distance vision, so essential in the chase, was much improved by the addition of the prisms, the following glasses were prescribed:

O. D. + 2.25 ○ — 4.50 D. cyl. axis 120° ○ 2° prism base out.
O. S. + .50 ○ — 2 D. cyl. axis 60° ○ 1° prism base out.

These glasses he is still using with comfort.

Recently he called to consult me about a slight deafness, and while in my office he gave me a demonstration of a novel method of correcting his astigmatism without glasses, that he had hit upon, viz, of applying slight pressure to the eye-balls by placing the tips of the fore finger against the lids and applying the pressure either at the lower nasal or the upper temporal quadrant of both eyes. By this simple procedure his vision could be changed in the right eye, from $\frac{18}{100}$ to $\frac{18}{15}$, and in the left from $\frac{18}{30}$ to $\frac{18}{15}$. This high standard of vision was of course only maintained as long as the pressure was kept up. It will be seen that the points selected for applying the pressure corresponds to the hyperopic meridian of either eye viz. 120° in the right and 60° in the left.

The explanation of the phenomenon is simple: As the convexity of the hyperopic meridian of the cornea was *increased* by the pressure, the convexity of the myopic meridian was *diminished* accordingly until a perfect uniformity of curvature was established in all meridians and emmetropia resulting, vision was normal.

He informed me that he frequently employed this method of improving his vision for a moment, when he wished to view some distant object quickly. His glasses being in his pocket, it was much more convenient to apply the tips of his fore-fingers to the eye-balls and press his biased cornea into shape, so that they might perform their office perfectly, than to put on his spectacles and let a pair of cunningly wrought lenses assist them. He was anxious to know if there was not some means known to surgical science, by which a "tuck" could be taken in the sclerotic at the corneal margin that would permanently establish a perfect uniformity of curvature in all meridians of the cornea.

I was obliged to inform him that, although I had been bold enough to produce astigmatism, in numerous instances, by an operation upon the eyes, never-the-less I felt very timid, and altogether too incompetent to undertake to remedy the error by an operation.

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## THE EIGHTH INTERNATIONAL CONGRESS OF OPHTHALMOLOGY

Which meets in Edinburgh on the 7th of August to remain in session until the 11th, will be presided over by Dr. Argyll Robertson. Several hundred oculists, in different parts of the world, have already signified their intention to attend and the meeting therefore promises to be a full one. One of the subjects to be discussed is Intra-ocular Therapeutics. Other important, and yet unsettled, questions pertaining to Ophthalmology will doubtless receive due consideration. Altogether the meeting will unquestionable be a very important one to all who attend. The membership fee will be £ 1 ($5.00) which can be sent in a postoffice order to Dr. Geo. A. Berry at the time of giving notification of intention to attend. The titles of papers should be sent in at as early a date as possible, certainly not later than July first. Papers on anatomical subjects and those giving statistical reports should be communicated in abstracts.

Membership fee will entitle the member to a copy of the transactions. Since no copies will be sold it will be necessary to attend in order to be a possessor.

The Paris will sail from New York on the 18th. of July. Those taking passage on this steamer will arrive in England in time to become thoroughly rested before the meeting of the British Medical Association at Bristol. The Section of Ophthalmology of that Association will be in session from the 2nd. to 5th. of August. Many who will be in attendance on that meeting will go direct to Edinburgh from Bristol. The editor of this Journal hopes to meet many of his American confreres both at Bristol and in Edinburgh.

## VOLUME III

Of the *Record* closes with this issue. For it the year has been a prosperous one from both a financial and literary point of view. Self-supporting from the beginning it has had no struggle for existence, and now at the end of the third year its perpetuity is assured.

Four hundred and eighty-two pages of reading matter have been given the subscribers during the year, the practical nature of which has not been surpassed by any other journal devoted to any specialty. The best thoughts of some of our best men have found expression in this volume. The variety of subjects discussed and the number of authors contributing are shown in the index contained in this issue.

While both time and money have been freely expended by the editor, he delights to confess that the richness of the volume is due to the many who have aided by subscribing and contributing. In helping the *Record* they have been helpful to one another, as has been confessed many times by those deriving benefit. To all who have in any way aided in the work of the year the editor presents his hearty thanks; and hopes their interest in the *Record* will never fag.

In passing out of the old year we go into the new with every assurance that

VOLUME IV

will compare favorably with any of its predecessors. The future is rich with promise. Several papers for the new volume are already at hand while there are others in process of preparation. Our prospective colaborators are many and the fruits of their labors will be abundant.

As in former volumes so in this, the scientific proceedings of the Section of Ophthalmology of the A. M. A. will be given our readers. Abstracts of all papers with the elicited discussions will be published as rapidly after the San Francisco meeting as may be possible. A full report of the scientific work of the International Congress of Ophthalmology which meets in Edinburgh, Aug. 7–11 will appear in the pages of the *Record*, as will also the work of the Ophthalmic Section of the British Medical Association which meets in Bristol, Aug. 2–5.

The material coming from these three sources will be worth more, far more, to any reader than the amount of his subscription to the *Record*. But this will constitute only a part of the value of the coming volume. Can any Oculist afford to miss what is promised?

## OBLIQUE ASTIGMATISM

Is a condition not as easy of correction as some think. In fact its study and correction constitute the most complicated work we have. Steele's rule for placing the axes of correcting cylinders in oblique astigmatism would be perfection itself if the oblique muscles were always harmonious. This rule as many of the readers of the *Record* will remember is: "In those cases in which the axes of the proper convex cylinders for the two eyes diverge, place the cylinders at those points which will give the axes the greatest divergence permitted by the tests; and in those cases in which the axes converge, place them at the points which will give them the greatest convergence permitted by the tests." By substituting *least* for *greatest* and *vice versa*, the same rule applies to concave cylinders.

"There is no rule without exceptions" applies to the Steele rule, but the exceptions in this instance should have only a temporary application. That the reasons for these exceptions may be clearly understood, it may be stated that in any form of uncorrected oblique astigmatism (hypermetropic, myopic or mixed) if the meridians of greatest curvature diverge above there is a consequent strain on the superior oblique muscles; if these meridians converge above there is then, necessarily, strain on the inferior oblique muscles. If in any of these cases the strain is on the superior oblique muscles (meridians of greatest curvature diverging above) and these muscles are insufficient (cyclophoria superior) Steele's rule holds good, but if in this condition the inferior obliques should be insufficient (cyclophoria inferior), the rule should be reversed temporarily. Again when the meridians of greatest curvature converge above and there is cyclophoria superior, Steele's rule for placing the axes of the cylinders must be reversed for the time, whereas if there is cyclophoria inferior the rule should be followed.

The following case will illustrate :

The lady had always been a sufferer with headache. Her refraction error was corrected, in right eye, by + 1 00 cyl. ax. 70°, and in left eye, by + .50 cyl. ax. 110°.

In this case the meridians of greatest curvature converged above and therefore necessitated strain on the inferior obliques. Her superior obliques were insufficient (cyclophoria superior). She could see about as well with the axis of right cyl. at 75° as at 70° and that of the left at 105° as at 110°, but following the rule of practice, the axes were placed respectively at 70° and 110°. The result was that the patient was less comfortable with than without the lenses; for with the lenses on the strain on the inferior obliques was relieved and the superior obliques, naturally too weak, were forced into unusual action in order to parallel the naturally vertical meridians, which before had been kept slightly divergent by the inferior obliques. Exercise of the superior obliques was attended by such pain that it was not persisted in. The patient read with far more comfort when wearing simple spherical lenses than when using those more accurately adjusted. Having arrived at the conclusions embodied in this editorial, from a more careful study of oblique astigmatism, the right glass was revolved through an arc of 10° (from 70° to 80°) and the left from 110° to 100° and the patient was asked once more to wear her spectacles, with the assurance that now she would experience comfort Formerly she had been able to wear them not more than an hour, because of the severe suffering brought on by them. She reported a week later having worn her glasses with relief during the whole time. She had also been able to endure the exercise of her superior obliques. A week later she gave another favorable report, and again, at the end of another week her report was good. During this time the vision was not as acute as when the cylinder was at 75° or even at 70° for right eye and 105° or 110° for left eye. As the development of the superior obliques goes on the axes of these cylinders will be shifted by degrees back to the points giving the sharpest vision and the patient will still have comfort.

The revolution of the cylinder in this case so displaced images as to throw strain on the inferior obliques in both eyes, and thus gave the naturally too weak superior obliques relief. Other cases could be given, but a paper on this subject is now in process of preparation.

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## FOREIGN BODIES IN PHARYNX AND LARYNX.

BY GEORGE BROWN, M.D., ATLANTA, GA.

(REPORT OF CASES.)

It has been truthfully said that a list of foreign bodies that had been found in, and removed from, the pharynx and larynx would comprise almost everything that the mind of man could think of. The varied substances that have been removed by different surgeons, would comprise a rare and curious collection, ranging from steam engines (toy) to leeches and from cedar pencils to pen knives.

I will instance a few cases from Dr. Hobbs' note-book, embracing some of the foreign bodies most frequently found in this region.

### PIN IN THE PHARYNX.

CASE No. 1. Six weeks after the accident, I detected what proved to be a pin at the bottom of a large abscess, in the lower pharynx, just below the right posterior pillar in a woman age thirty-two. The entrance of the foreign body was unknown to the patient, until after its discovery and extraction. The persistence of the many aggravated symptoms and the abscess itself, caused the patient to go through several hands before I saw her. Fortunately, in my efforts to probe the abscess to the bottom, I found its cause and extracted the pin at the first sitting; healing rapidly followed.

### PIN IN LARYNX.

Case No. 2. A girl aged fourteen, accidentally got a pin lodged in her larynx. The pin pierced false band near its inner edge, thence across the glottic Slit and through the right cord. The history and symptoms of this case. were very similar to case below of tack in larynx. After much difficulty, on the following morning, the pin was grasped midway with a McKenzie's forceps and forcibly dislodged. The œdema rendered it impossible to see the head of the pin but the consequent laceration produced but little bleeding, although the pin came out bent almost double But little aphonia resulted and none of the dangerous symptoms of the case below followed the immediate extraction of the foreign body.

### TACK IN LARYNX.

Case No. 3. John H., aged twenty-two, by a sudden inhilation, drew an ordinary carpet tack into the glottis. The sharp end penetrated the left cord and the head lodged beneath the right. When I first saw the patient, twenty-four hours after the accident, the œdema had become so great that asphyxia seemed imminent; this condition had been gradually increasing for twelve hours. Instruments were ready for a tracheotomy but finally after many repeated attempts, I obtained a glimpse of the condition of the glottis and the position of the foreign body. When by repeated trials, though not succeeding again in getting a good view, I grasped the tack about midway between its point and head with a modified duck bill forceps. Considerable force was necessary to tear it from its œdematous bed; an alarming paroxysm of coughing followed with considerable bleeding. Each minute at this time was an anxious one. Both O'Dwyer's tube and tracheotomy instruments were ready for immediate use but after some moments the bleeding had so much reduced the glottic stenosis, that the patient passed the dangerous point and slept after a few hours. Resolution was rapid, except that aphonia lasted about six weeks.

### A COCKLEBURR IN LARYNX.

Case No. 4. A boy aged eight was brought to my office by two physicians, that I might make a laryngotomy for the removal of a cockleburr but after a cocaine spray and a laryngoscopic examination, the burr was seen to be lodged just beneath the glottic opening and was extracted without much difficulty with the long curved forceps. Strange enough, there was no aphonia the voice only showing a slight hoarseness for a few days. Recovery was complete.

### FOREIGN BODY IN NASAL PASSAGE.

Case No. 5. By a mere coincidence the next case I saw was one of complete sphonia, in a child of four years, produced by the lodgement of a shoe button in the post-nasal space. The foreign body, from the history of the case, had been pushed into the nose four months before by the little one and the loss of voice had existed for six weeks. The sequel proved that the foreign body was the cause of the aphonia as the first effort at vocalization after its extraction was successful. The voice continued good. The reason for mentoning the above case in this connection is obvious. There was no aphonia in the last case, when the cords were directly involved and yet a total loss of voice followed the distant lesion in this case. This is the so-called laryngitis, that is found so often (?) and exists so seldom—of the so-called laryngitis, perhaps 90% are due to nasal reflexes and exist only through subjective symptoms.

I will also add some cases recently seen in my own room.

### A PIECE OF MEAT IN GLOTTIS.

Case No. 1. Gentleman, age sixty-six, farmer, eating breakfast of "spareribs," suddenly felt a choking sensation. Living ten miles from the city, he was hurriedly driven into town for relief. As he had a very sensitive throat, I first sprayed it well with a cocaine solution, then found imbedded in the glottis what proved to be a very large piece of meat, very tough and fibrous.

It was easily removed with long curved forceps, giving the patient instant relief and use of his voice.

### A PIECE OF BONE IN LARYNX.

Case No. 2. A gentleman aged thirty-five, while eating a luncheon composed of a beef stew, suddenly felt something slip into his larynx. After using a cocaine spray, a piece of bone was seen lying across the glottic slit, one end of which was imbedded in the ary-epiglottic fold between the base of the epiglottis and the cartilage of Wrisberg. The bone being perfectly white, was easily seen and as easily removed. It was triangular in shape, nearly ¾ of an inch in length and tapered to a very sharp point at the apex; perfect recovery.

We are often consulted by patients who think they have a foreign body in the throat and are loath to believe that such is not the case. I will mention a few such instances:

### REFERRED TO ME BY DR. C. EVANS JOHNSON.

Case No. 1. A negro woman, age thirty-five, said she had a fish scale in her throat, that had been troubling her for fifteen years. Nothing whatever could be found, except a sensitive area of pharynx. Decided hypertrophy of the middle turbinate bone on the affected side was, in my opinion, the cause of her symptoms. She refused any treatment and I saw her no more.

Case No. 2. Negro waiter aged forty, had swallowed a dime given him as a "tip" by a gentleman, eight years ago. It was a very migratory coin as at times he felt it on one side and suddenly it would change to the other. When I saw him, it was behind the palate and in a few moments, it was in the frontal sinus and shortly afterwards in the larynx. Of course no dime was found, much to his disgust. A general atrophic condition of the upper air passages was responsible for the different resting places of the coin.

Case No. 3. Major of adjoining town, aged thirty, was walking down the street and suddenly felt something drop into his larynx. He at once suffered extreme discomfort in breathing, in fact almost suffocated, and was badly frightened when I saw him a few moments later. The most thorough examination failed to discover any foreign body in the larynx and as he had nothing in his mouth at the time, nor had there been since morning. I could only attribute it to a spasm of the Glottis. A spray of camphor mentholine gave instant relief.

CASE No. 4. Engineer aged twenty-eight while walking down the street during a snow-storm, the handle of his umbrella became loosened from the staff. As it was attached with glue he put the staff in his mouth to moisten the glue in order to replace the handle. At that instant a gentleman ran against the other end of the umbrella and drove it with considerable force into his mouth. I saw him a few moments afterwards and found that the end of the staff had passed completely through the soft palate and a small piece of flesh was hanging down, nearly on a level with the base of the tongue, this was clipped off with a pair of scissors. Patient insisted that there was another piece in his larynx but I failed to find any foreign body there.

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